SL-HF150ES/150AS
RMT-231

SERVICE MANUAL

EC Model
Australian Model

August, 1985

711B2 CHASSIS

SPECIFICATIONS

System

Video recording system
Rotary two-head helical scanning

Audio recording system
Beta hi-fi PAL system (2 channels)
(Recording on the conventional audio track is monaural.)

Video signal
SL-HF150ES:
CCIR standards, PAL and DDR SECAM colour
SL-HF150AS:
CCIR standards, PAL colour

Aerial input
75-ohm, asymmetrical aerial socket

Stereo/bilingual system
SL-HF150ES:
West-German two-carrier system
SL-HF150AS:
Australian two-carrier system

Channel coverage
SL-HF150ES:
VHF: Western European channels E2-U20
UHF: Western European channels E21-E68
(Up to 30 programmes can be preset.)
SL-HF150AS:
VHF: Australian channels 0 – 11
UHF: Australian channels 28 – 34, 39 – 63
(Up to 30 programmes can be preset.)

RF output signal
SL-HF150ES:
UHF channels E30 to E39 (variable)
75 ohms, unbalanced
SL-HF150AS:
VHF channel 0 or 1, selectable
75 ohms, unbalanced

Video

Input
VIDEO IN: BNC connector
1.0 V (p-p) $^{+1.0}_{-0.5}$ V (p-p)
75 ohms, unbalanced,
sync negative

Output
VIDEO OUT: BNC connector
1.0 V (p-p) ±0.1 V (p-p)
75 ohms, unbalanced,
sync negative

Horizontal resolution
260 lines

Signal-to-noise ratio
Colour: Better than 40 dB
B/W: Better than 43 dB

Audio

Input
AUDIO IN: 2 phono jacks
47 kilohms, −10 dBs
(0 dBs = 0.775 V rms)

Output
AUDIO OUT: 2 phono jacks
Load impedance less than 10 kilohms
−10 dBs with 47 kilohms load, unbalanced
Headphones: Stereo phone jack
- 26 dBs, 8 ohms

– Continued on next page –

MICROFILM

Consumer VIDEO

Beta VIDEO CASSETTE RECORDER

SONY®

Beta hi-fi PAL sound
Frequency response
20 Hz to 20 kHz (MPX FILTER OFF)
Wow and flutter
Less than 0.005 % WRMS
Dynamic range
More than 80 dB

Video/audio output
AV connector 6-pin DIN connector

Tape transport
Tape speed 18.73 mm/sec.
Maximum recording time
2 hours 10 min. (with Sony L-500 cassette)
3 hours 15 min. (with L-750)
Fast forward/rewind time
Within 5 min. (with L-500)

Timer
Clock Crystal lock
Time indication 24-hour cycle
Timer setting Only for recording
4 events/3 weeks, adjustable for any day or for all 7 days of the week

General
Power requirements
SL-HF150ES: 220 V AC ±10%, 50/60 Hz
SL-HF150AS: 240 V AC ±10%, 50 Hz
Power consumption
43 W
Storage temperature
-20° C to + 60° C (-4° F to + 140° F)
Operating temperature
5° C to 40° C (41° F to 104° F)
Dimensions Approx. 430 × 95 × 390 mm (w/h/d)
(17 × 3 3/4 × 15 3/8 inches)
including projecting parts and controls
Weight Approx. 9.3 kg (20 lbs 8 oz) net

Accessories supplied
Demonstration video cassette tape (1) (AS model)
75-ohm coaxial cable for recorder to TV connection (1)
Remote Commander RMT-231 with two IEC designation R6 batteries (1)
RF channel adjustment screwdriver (1) (EC model)

Design and specifications subject to change without notice.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

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SECTION 1
GENERAL

1-1. PRECAUTIONS

On safety

- SL-HF150ES operates on 220 V ac, 50/60 Hz.
- SL-HF150AS operates on 240 V ac, 50 Hz.
- Should any solid object or liquid fall into the cabinet, turn off the unit and have it checked by qualified personnel before operating it any further.
- To disconnect the mains lead (ac power cord), pull it out by the plug. Never pull the lead itself.
- The unit is not disconnected from the mains (ac power source) as long as it is connected to the mains outlet, even if the unit itself has been turned off.

On installation

- Allow adequate air circulation to prevent internal heat build-up. Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation grille.
- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- The unit is designed for operation in a horizontal position. Do not install it in an inclined position.
- Keep the unit and cassette tapes away from equipment with strong magnets, such as a microwave oven, large loudspeakers, etc.

On operation

- When the unit is not to be used for a long period, turn the unit off to conserve energy and to extend the useful life of your unit.
- Remove and store video cassettes after recording or playback. Always store the cassette in its case to keep the tape away from dust.

On cleaning

Clean the cabinet, panel and controls with a dry soft cloth. Do not use a moistened cloth or any type of solvent, such as alcohol or benzine, which might damage the finish.

On repacking

Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

On colour broadcasting systems

This machine is designed to record and play back using the PAL colour system (SL-HF150AS) or the PAL and DDR SECAM colour systems (SL-HF150ES). Recording and playback of video sources based on other colour systems cannot be guaranteed.

If you have any questions about this unit, contact your Sony dealer.

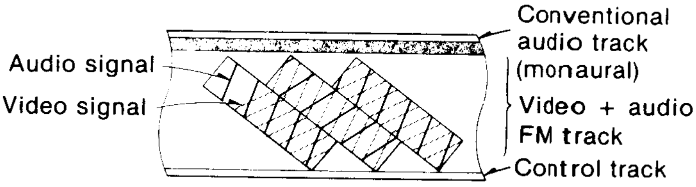
What is Beta hi-fi PAL recording?

In conventional recording, audio signals are recorded on the audio track and the video signals on the video track. On Beta hi-fi recording, audio signals are recorded on the video track together with the video signals.

In this recorder's Beta hi-fi PAL system, audio signals are recorded first, using the 2 audio heads, then video signals are recorded over the audio signals with an azimuth offset, using the 2 video heads.

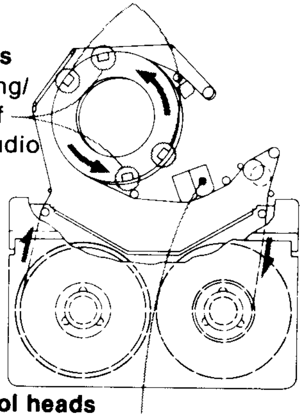
Beta hi-fi audio signals are frequency-modulated and recorded on 2 channels, so you can record a stereo or bilingual programme with sound clearly superior to that of a conventional audio recording.

Beta hi-fi PAL recording pattern on the video tape



Video heads
For recording/playback of video signals

Audio heads
For recording/playback of Beta hi-fi audio signals



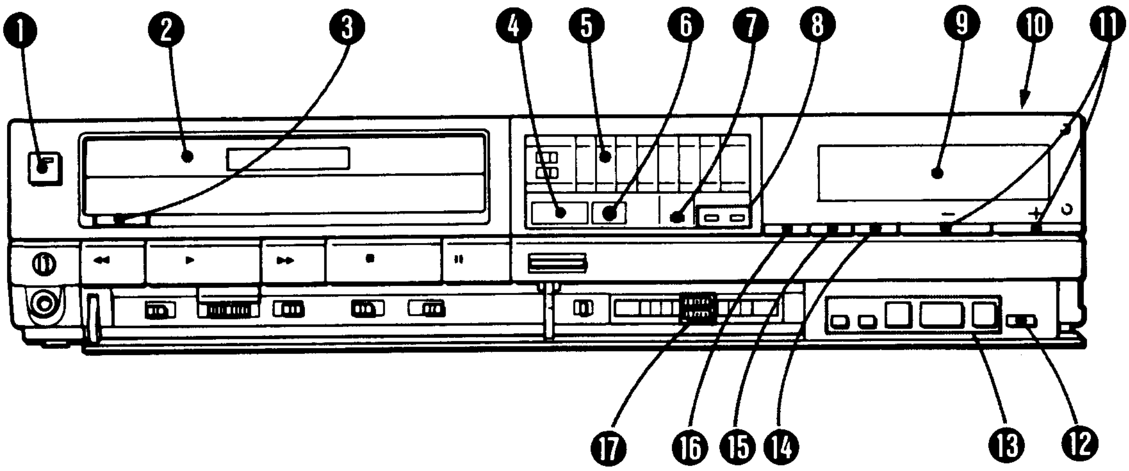
Audio/control heads
For recording/playback of conventional audio signals and control signals.

Beta hi-fi recording on this recorder

This recorder simultaneously records audio signals on the video track (Beta hi-fi recording) and on the conventional audio track (in monaural), so that tapes recorded with this recorder can be played back on an ordinary video cassette recorder without a Beta hi-fi system.

1-2. LOCATION AND FUNCTION OF CONTROLS

Front



❶ **ON/STANDBY switch and indicator**
Press to turn on the unit. The indicator will light up. Press again to turn it off.
The timer section will continue to operate and the time will be displayed even if the ON/STANDBY switch is off.

❷ **Cassette compartment**
Insert a cassette after turning on the recorder. The o■ indication appears on the display window when a cassette is inside.

❸ **⏏ EJECT button**
Press to remove the cassette. This button does not function when the recorder is turned off.

❹ **Beta hi-fi lamp**
Lights to show Beta hi-fi recording, or playback of a Beta hi-fi recorded tape regardless of the BETA HIFI AUDIO OUT selector's position.

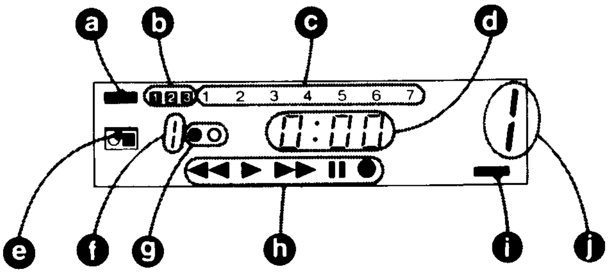
❺ **PEAK PROGRAM METER**
These meters show the peak input level of each channel (left and right) during Beta hi-fi recording, and recorded levels during playback.

❻ **REMOTE SENSOR**
Detects the remote control signal transmitted from the supplied Remote Commander.

❼ **SOUND lamp**
When the BETA HIFI RECORD mode selector is set to SOUND, this lamp lights to show audio recording. It also lights when a tape with audio signals only is being played back.

❽ **STEREO A, B lamps**
When a stereo TV programme is being received, both lamps light up. When a bilingual programme is being received, either A or B lamp lights up. These lamps do not activate when a pre-recorded stereo or bilingual tape is played.

❾ **Display window**



ⓐ **TIMER REC indicator:** Shows the recorder is in the timer standby mode. It remains displayed until the timer recording is finished.

ⓑ **Week indications:** Show the week in which the timer recording will take place.

ⓒ **Day of the week indications**

ⓓ **Time and counter display:** Usually shows the present time.
When the CLOCK/COUNTER button is pressed to COUNTER, the display shows the counter number.

ⓔ **Cassette-inside indication:** Shows a cassette is inserted.

ⓕ **Event number indication**

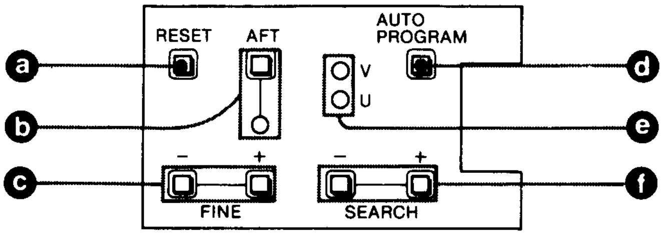
ⓖ **Turn-on and turn-off setting indications:** The "●" mark shows the display is the turn-on time of the timer recording and the "O" mark shows the turn-off time.

ⓗ **Tape operation mode indicators:** Show the engaged tape operation mode: ◀◀ (rewind), ▶ (playback), ▶▶ (fast-forward), ❚❚ (pause) or ● (recording).

ⓘ **VTR indicator:** Shows the recorder is in the VTR mode.

ⓙ **Programme number:** Shows the programme number selected with the PROGRAM/TIMER + and − buttons.
When the INPUT SELECT switch is set to LINE/PCM to record signals from the VIDEO IN and AUDIO IN jacks, the indication will change to "AU".

⑩ **Tuning compartment**
All the switches and buttons for programming stations are in this compartment.

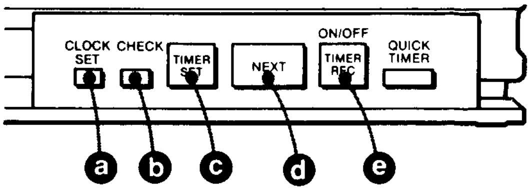


- ⓐ **RESET button:** To clear the programmed station, press this button.
- ⓑ **AFT button and lamp:** The AFT circuit activates automatically after the stations are tuned and memorized with automatic and manual programming. The AFT lamp will illuminate. If you wish to restore the AFT on the station which has been fine-tuned manually with the FINE buttons, press the AFT button.
- ⓒ **FINE + and − buttons:** Press to fine-tune the station.
- ⓓ **AUTO PROGRAM (automatic programming) button:** To preset the receivable stations automatically, press this button.
- ⓔ **Tuning indicator:** Indicates the tuning band.
- ⓕ **SEARCH + and − buttons:** Press to tune in a station. Press the − button to get a station of lower frequency and the + button to get a station of higher frequency.

⑪ **PROGRAM/TIMER +/− button**
Press + to advance or − to reverse the programme numbers. Also used for clock setting and timer setting.

⑫ **QUICK TIMER button**
Press to set the recording duration up to 4 hours in units of 30 minutes.

⑬ **Buttons for clock and timer setting**



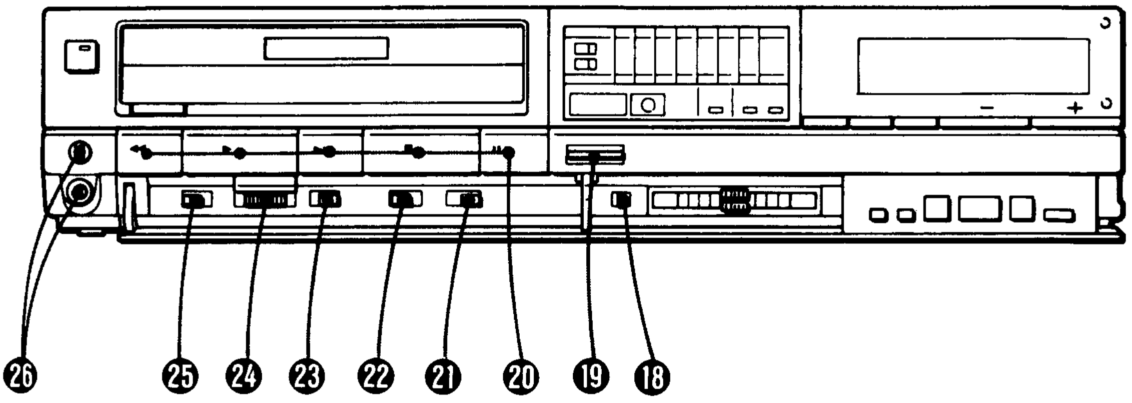
- ⓐ **CLOCK SET button:** Press to initiate clock setting.
- ⓑ **CHECK button:** Press to check timer settings.
- ⓒ **TIMER SET button:** Press to initiate timer setting.
- ⓓ **NEXT button:** Press to advance to the next item to be set during clock or timer setting.
- ⓔ **TIMER REC ON/OFF button:** Press to activate timer recording. Press it again to deactivate timer recording or quick timer recording in timer standby mode or while recording.

⑭ **CLEAR/RESET button**
Press to set the tape counter reading to "0000" when the tape counter is displayed. Also used for changing the timer setting or erasing the memory of the timer setting.

⑮ **CLOCK/COUNTER button**
Press to set the display to the tape counter. To reset to clock, press it again.

⑯ **TV/VTR select button**
To view a TV programme selected by the PROGRAM/TIMER buttons on the recorder or to monitor the picture being recorded, press this button so that the VTR indicator appears in the display window. When the ▶ PLAY button on the recorder is pressed, the recorder is automatically set in the VTR mode. To view a TV programme in the usual manner, press this button so that the indicator goes off. When the recorder is turned off, the recorder is automatically set in the TV mode.

⑰ **REC LEVEL (recording level) controls**
These controls adjust the audio recording level on the Beta hi-fi recording. The R control is for the right channel, and L is for the left channel. Normally set to 5 (green position) for recording TV programmes. When you are recording audio signals from other audio equipment, adjust manually to the correct position for the optimum result.



⑱ BILINGUAL select button
Selects the language of the bilingual TV programme.

⑲ ● RECORD button
Press to start recording.

⑳ Function buttons

◀◀ REW button: Press to rewind the tape. Also used for the reverse picture search, skip scan and auto play operation.

▶ PLAY button: Press to play the tape back. Also used for auto play operation.

▶▶ FF button: Press to advance the tape rapidly. Also used for the forward picture search and skip scan operation.

■ STOP button: Press to stop the tape.

❚❚ PAUSE button: Press to stop the tape for a moment during recording or playback. A still picture will be seen during playback. Press again to release the pause mode.

㉑ INPUT SELECT switch
Select the programme to be recorded.

TUNER: for recording TV programmes.

SIMUL: for recording FM simulcast programmes or timer-activated audio recording.

LINE/PCM: for recording signals connected to the VIDEO IN and AUDIO IN jacks.

㉒ BETA HIFI MPX FILTER (multiplex filter) switch
Normally set to ON for Beta hi-fi recording. The multiplex filter cuts off the high-frequency signals which sometimes grate on the ear. If you wish to record without cutting the high frequencies, set to OFF.

㉓ BETA HIFI RECORD mode selector

VIDEO: Normally, set to this position. Sound and picture are recorded on the Beta hi-fi system.

SOUND: Set to this position to record sound only with the Beta hi-fi system.

㉔ TRACKING control
If streaks or snow appears during the playback of a tape recorded on another recorder, turn this knob to obtain the best possible picture.

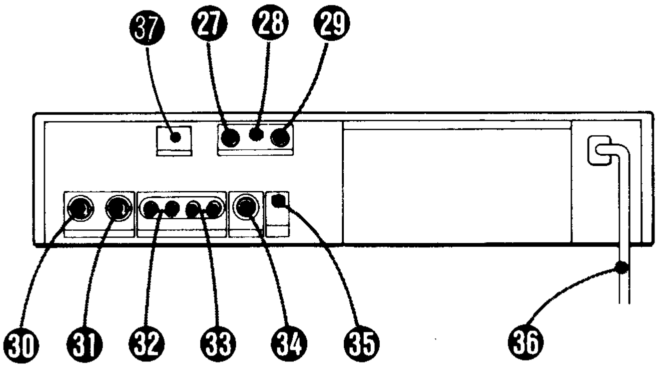
㉕ BETA HIFI AUDIO OUT selector
Selects the video track or the audio track for sound playback.

AUTO: Normally, set to this position. The recorder will automatically select the video track for Beta hi-fi recorded tapes, or the audio track for tapes recorded without the Beta hi-fi system.

NORMAL: Set to this position when you wish to listen to the sound recorded on the audio track of a Beta hi-fi recorded tape.

㉖ Headphone jack and HEADPHONE LEVEL control
Connect headphones to the headphone jack (stereo phone jack) to monitor the sound. The HEADPHONE LEVEL control adjusts the headphone volume.

Rear



㉗ **AERIAL OUT socket**
Connect the aerial input of the TV receiver using the supplied cable.

㉘ **DX/LOCAL switch (EC model)**
Normally set this switch to DX. If the TV signal is very strong, set the switch to LOCAL.

㉘ **RF unit selector (AS model)**
Select the output channel at the AERIAL OUT socket. Set the selector to VHF 0 ch or 1 ch, whichever is not active in your area.

㉙ **AERIAL IN socket**
Connect the aerial cable.

㉚ **VIDEO OUT jack (BNC type)**
Connect to the video input of another video cassette recorder, a video monitor or a PCM digital audio processor.

㉛ **VIDEO IN jack (BNC type)**
Connect to the video output of a camera, another video cassette recorder, a PCM digital audio processor, etc.

㉜ **AUDIO OUT jacks (phono type)**
Connect to the audio inputs of a video monitor or video cassette recorder, or to the auxilliary inputs or tape inputs of a stereo amplifier.

㉝ **AUDIO IN jacks (phono type)**
Connect to the audio outputs of a camera or another video cassette recorder, or to the recording outputs of a stereo amplifier.

㉞ **AV connector (6-pin, DIN)**
Connect to the 6-pin or 8-pin DIN connector of a TV receiver or colour monitor. This connector provides the video and audio output signal.

㉟ **TEST SIGNAL switch**
Set to ON to obtain the test pattern for adjusting the TV so that it can receive the signal from the recorder.

㊱ **AC mains lead**

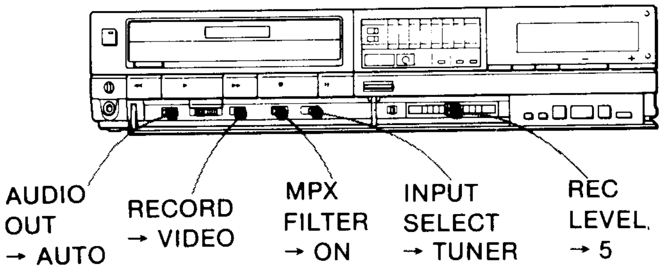
㊲ **RF CHANNEL screw (EC model)**
If there is interference on the factory-preset channel for RF output and the signal of this recorder cannot be displayed clearly on the TV screen, adjust this screw with the supplied screwdriver.

1-3. TV PROGRAMME RECORDING

(Beta hi-fi recording)

CHECK BEFORE RECORDING

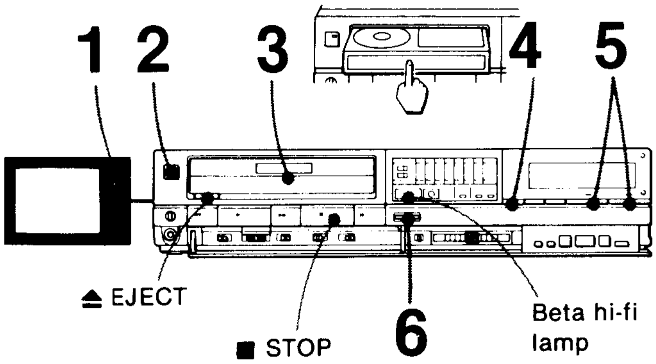
The green position is the standard setting position for Beta hi-fi recording.



Recording will be done both on the video track (Beta hi-fi recording) and on the conventional audio track.

TO RECORD

Numbers in the illustration show the sequence of operation.



1 Turn on the TV and select the programme position for the recorder.

2 Press the ON/STANDBY switch. The indicator on the switch and the Beta hi-fi lamp will light up.

3 Insert the cassette with the round window to the left. The ▣ indication will appear in the display window.
- Do not use force when inserting the cassette into the compartment.

4 Press the TV/VTR button so that the VTR indicator appears in the display window.

5 Select the programme to be recorded with the +/– PROGRAM/TIMER buttons. + for higher numbered programmes, and – for lower numbered programmes.

6 Press the ● RECORD button. The ● indicator will appear on the display window and recording will begin.
- If the inserted cassette does not have the safety tab, or if the tape is at its end, the cassette will be automatically ejected.

To stop recording, press the ■STOP button.

To eject the cassette, press the ≜ EJECT button after stopping the recording.

To view another TV programme while recording, press the TV/VTR button so that the VTR indicator goes off and select the programme you want to view with the TV's programme selector.

When the tape reaches the end during recording, it will be automatically rewound.

Note
The recorder can be automatically turned on by inserting a cassette without pressing the ON/STANDBY switch.

CAUTION
Television programmes, films, video tapes and other materials may be copyrighted.
Unauthorized recording of such material may be contrary to the provision of the copyright laws.

TO STOP RECORDING MOMENTARILY

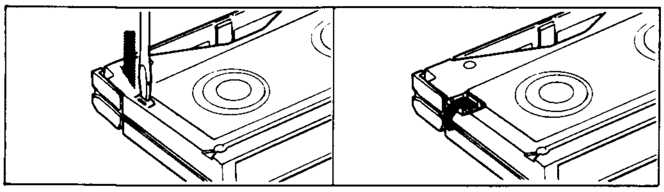
Press the ❚❚ PAUSE button. The ❚❚ indicator will appear on the display window. The TV programme can be seen on the TV, but the picture will not be recorded.
To resume recording, press the ❚❚ PAUSE button again.
To protect the video heads and the tape, the pause mode will be automatically released after about 8 minutes and recording will stop.

TO KEEP A RECORDED PROGRAMME FROM BEING ACCIDENTALLY ERASED

When a new recording is made on a previously recorded cassette, the previous recording will be automatically erased.

To avoid erasing a recording
Break off the safety tab using a screwdriver or similar object.

To re-record on a cassette which has had the safety tab removed
Cover the slot with a piece of plastic tape.

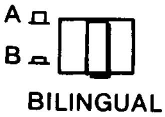


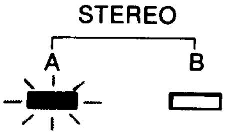
If you activate the ● RECORD button or the TIMER REC ON/OFF button with a cassette with its safety tab removed inserted, the cassette will be automatically ejected.

RECORDING A STEREO OR BILINGUAL PROGRAMME

When the STEREO A and B lamps light up, a stereo programme is being received. The recording procedure is the same as in TV programme recording.

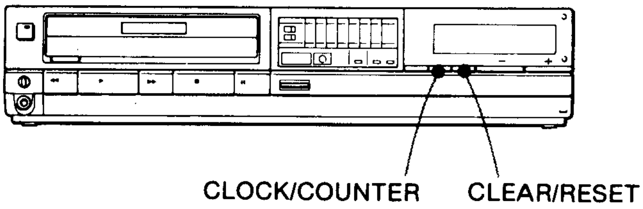
If either the A or B lamp lights up, a bilingual programme is being received. Select the local language (usually broadcast on channel A) or the original language (usually broadcast on channel B) by pressing the BILINGUAL select button.





TO INDEX A RECORDED PROGRAMME USING THE TAPE COUNTER

Turn on the recorder and press the CLOCK/COUNTER button to display the counter reading in the display window.
To return the display to the present time, press the CLOCK/COUNTER button again.



Before starting recording or playback, press the CLEAR/RESET button to set the counter to "0000".
By noting the counter reading at the desired point, you can easily find that point later by referring to the counter.

Notes

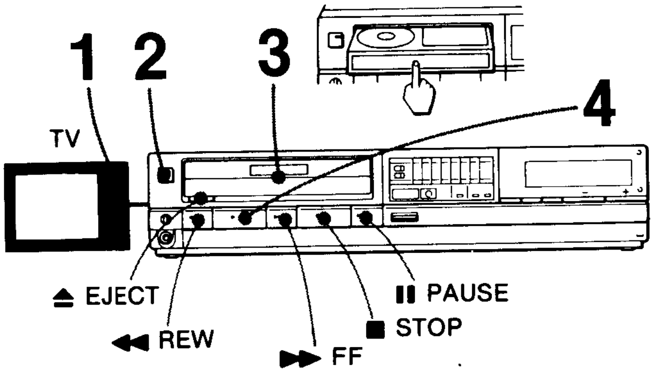
- The counter reading is automatically reset to zero when a cassette is newly inserted.
- While the recorder is off, the display shows the present time, regardless of the CLOCK/COUNTER button setting.
- The counter reading will be retained in the memory even after the recorder is turned off, as long as the cassette is in the cassette compartment.
- The tape counter does not operate when a blank, unrecorded tape is played.

AUTOMATIC STOP

When the tape counter is displayed, rewinding stops at approximately "0000" on the tape counter. To rewind the tape further, press the ◀◀ REW button again.
When the current time is displayed, rewinding stops at the beginning of the tape.

1-4. PLAYBACK

Numbers in the illustration show the sequence of operation.



1 Turn on the TV and select the programme position for the recorder.
2 Press the ON/STANDBY switch. The indicator on the switch and the Beta hi-fi lamp will light up.
3 Insert the cassette with the round window to the left. The ▣ indication will appear in the display window.
4 Press the ▶ PLAY button. The ▶ indicator will appear in the display window and playback will begin.

To stop playback, press the ■ STOP button.

To rewind the tape, press the ◀◀ REW button.

To advance the tape rapidly, press the ▶▶ FF button.

To eject the cassette, press the ⏏ EJECT button.

When the tape reaches the end during playback, it will be automatically rewound.

To get a still picture, press the ❚❚ PAUSE button during playback. A still picture will be seen on the TV screen. To resume playback, press the button again.
The pause mode will be automatically released after about 8 minutes and the playback will resume.

SELECTION OF PLAYBACK SOUND

Normally, set the BETA HIFI AUDIO OUT selector to AUTO. The sound recorded on the video track of Beta hi-fi recorded tapes, or the sound recorded on the conventional audio track of non-Beta hi-fi recorded tapes will automatically be played back.
If you wish to listen to the sound recorded on the conventional audio track of a Beta hi-fi recorded tape, set the selector to NORMAL. Return it to AUTO after playing back the tape.

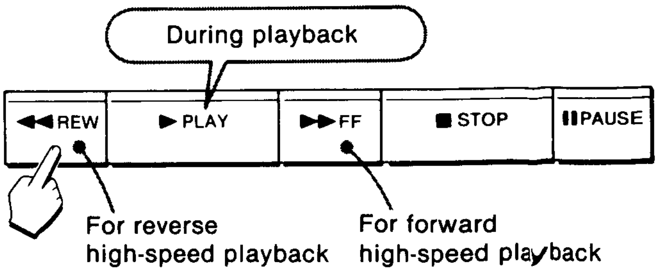
Playback sound and Beta hi-fi lamp
The Beta hi-fi lamp lights to show that a Beta hi-fi recorded tape (not Beta hi-fi recorded sound) is being played back.

AUDIO OUT selector	Beta hi-fi recorded tape		Non Beta hi-fi recorded tape	
AUTO	Sound on the video track (Beta hi-fi recorded)	Beta hi-fi	Sound on the conventional audio track	■
NORMAL	Sound on the conventional audio track	Beta hi-fi		

PICTURE SEARCH

—Viewing the picture at high speed to find a particular scene

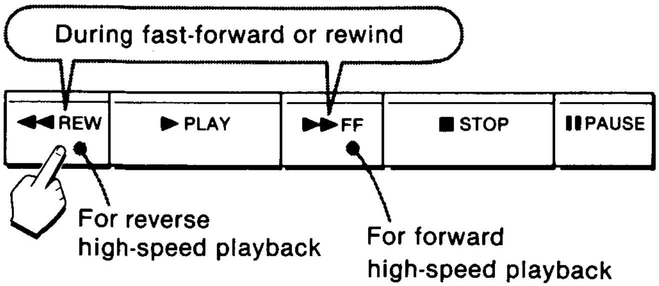
During playback, keep the ◀◀ REW or ▶▶ FF button pressed to reverse or advance the picture at high speed. Release the button at the desired point. Normal playback will resume. The picture search mode can also be assured directly from the pause mode.

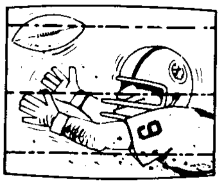

During playback
◀◀REW
▶PLAY
▶▶FF
■STOP
❚❚PAUSE
For reverse high-speed playback
For forward high-speed playback

SKIP SCAN

—Viewing the picture momentarily in the fast-forward or rewind mode

During rewind mode, keep the ◀◀ REW button pressed for high-speed picture reverse. **During fast forward mode,** keep the ▶▶ FF button pressed for high-speed picture advance. The picture appears momentarily while either of the buttons is pressed. Release the button at the desired point. Normal rewind or fast forward mode will resume.


During fast-forward or rewind
◀◀ REW
▶ PLAY
▶▶ FF
■ STOP
❚❚ PAUSE
For reverse high-speed playback
For forward high-speed playback

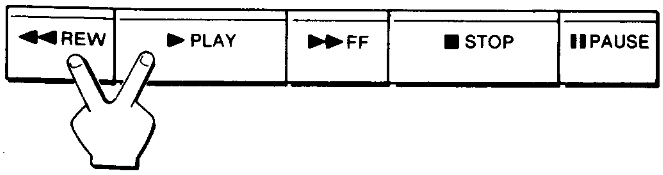


Streaks will appear during the picture search, the skip scan and the pause modes.

AUTO PLAY

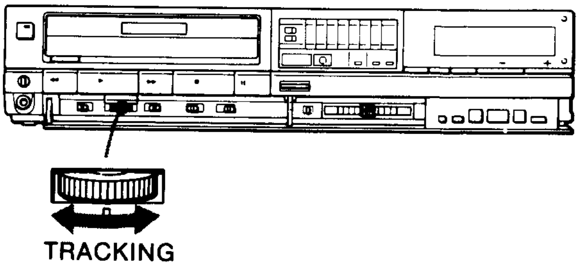
—To rewind the tape and automatically play it back

Press the CLOCK/COUNTER button to display the tape counter. Press the ▶ PLAY button and ◀◀ REW button simultaneously in stop mode. After the tape is rewound to approximately "0000" on the tape counter, it will be automatically played back.
If the ▶ PLAY button and ◀◀ REW button are pressed when the current time is displayed, the tape will be played back from the beginning.
During rewinding, the ▶ and ◀◀ indicators in the display window blink alternately.



WHEN PLAYING BACK A TAPE RECORDED ON ANOTHER MACHINE

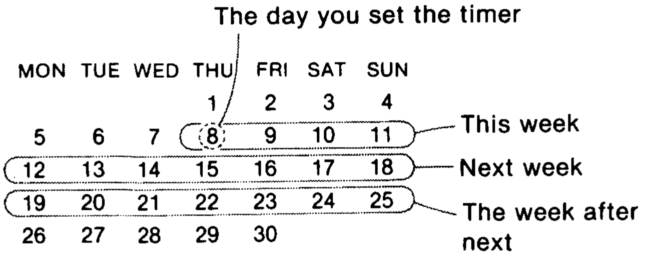
- A tape recorded on another recorder without Beta hi-fi system is played back automatically in the conventional way.
- If streaks or snow appears during playback, adjust the TRACKING control for the best possible picture. Return the control to the centre position after playing back the tape.
- If the sound of a tape recorded on another Beta hi-fi recorder is noisy or cannot be heard, adjust the TRACKING control.



1-5. TIMER-ACTIVATED RECORDING

Using the built-in timer, you can make four recordings any day or every day, either this week, next week or the week after next.

Possible days for recording


The day you set the timer
This week
Next week
The week after next

MON	TUE	WED	THU	FRI	SAT	SUN
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

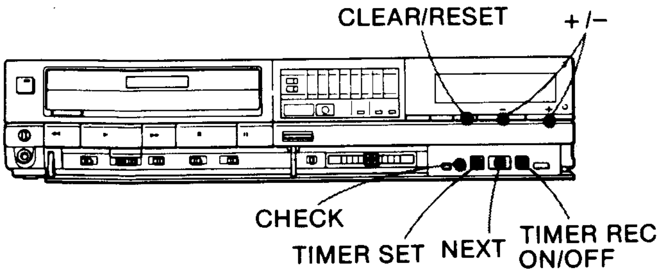
Check before setting the timer

- Is the clock set to the correct day and correct time? Timer setting can only be made after the clock has been set.
- Is a cassette inserted in the recorder?
- Is the cassette long enough to record the programmes?
- Does the cassette have a safety tab on the bottom?

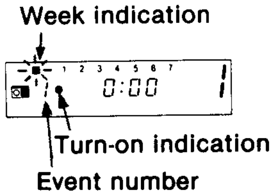
Note : The timer cannot be set during recording or playback.

TO SET THE TIMER

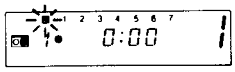
Example : To record a PROGRAM 2 broadcast from 9 : 00 AM to 11 : 25 AM on Friday next week.


CLEAR/RESET
+/–
CHECK
TIMER SET
NEXT
TIMER REC ON/OFF

1 Press TIMER SET.
(If the recorder is off, it will be turned on automatically.)
An empty event number for which no timer setting has been made will appear.

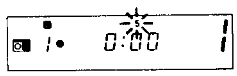

Week indication
1 2 3 4 5 6 7
1
0:00
1
Turn-on indication
Event number

2 Set the week by pressing + or – .
Week indication changes :

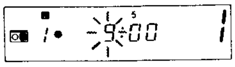

1 2 3 4 5 6 7
1
0:00
1

→ 1 → 2 → 3
(This week) (Next week) (The week after next)

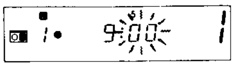
3 Press NEXT and set the turn-on day by pressing + or –.
Day indication changes :
1234567(every day)→1→2→...7



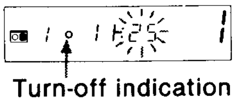
4 Press NEXT and set the turn-on hour by pressing + or –.



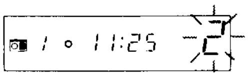
5 Press NEXT and set the minute by pressing + or –.
(To set to 00 minutes, there is no need to press + or –.)



6 Press NEXT and set the turn-off hour and minute with + or – as in turn-on time setting.


1
11:25
1
Turn-off indication

7 Press NEXT and select the programme to be recorded with + or –.
To record the signals from the equipment connected to the VIDEO IN jacks, set INPUT SELECT to LINE/PCM so that "AU" indication appears.

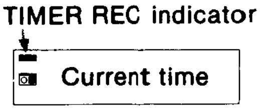


8 Press NEXT.
The display reverts to the current time.

Current time

To set more events, press TIMER SET again to display the next event number. Repeat steps 2 to 8 above.

9 Press TIMER REC ON/OFF.
The TIMER REC indicator appears and the recorder is turned off.


TIMER REC indicator
Current time

At the preset turn-on time, recording will start automatically and will stop at the preset turn-off time.

Note
If the inserted cassette is at its end or does not have the safety tab, the cassette will be automatically ejected when the TIMER REC ON/OFF button is pressed.

ONCE THE TIMER REC INDICATOR HAS BEEN DISPLAYED, NO FUNCTION OF THE RECORDER CAN BE ACTIVATED, except for checking the timer setting.
To operate the recorder after setting the timer for recording, press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off. To reactivate the timer recording standby mode, be sure to press the TIMER REC ON/OFF button again.

WHILE SETTING THE TIMER

To change the preset item
Press the CLEAR/RESET button and repeat the timer setting procedure from step 2.

To record to the end of the tape
Set the turn-off time to a time after the tape will reach its end.

BEFORE OR DURING TIMER RECORDING

To check the timer settings
Press the CHECK button. Each time the CHECK button is pressed, the display will change to the preset turn-on time and the turn-off time from event 1 to 4, then the current time.
During actual timer recording, only the turn-off time of that event can be checked.

To change the settings of an event

1. Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off.
2. Press the CHECK button enough times to display the event to be changed.
3. Press the CLEAR/RESET button.
4. Repeat the timer setting procedure from step 2.

To erase the timer setting of an event

1. Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off.
2. Press the CHECK button enough times to display the event to be erased.
3. Press the CLEAR/RESET button.
4. Press the TIMER SET button. The event will be erased from the memory.
5. If other events have been preset for recording, press the TIMER REC ON/OFF button again to reactivate.

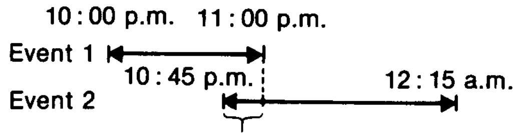
Note : When the TIMER REC indicator is displayed, the timer setting cannot be erased.

If the tape reaches the end during timer recording
The recording will stop and the tape will be rewound to the beginning. Then after about a second, the recorder will be turned off.

To stop the on-going timer recording
Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off. The unit will be turned off automatically after about a second.

When a power interruption occurs
If the clock shows "0 : 00" and the dots blink, all the timer settings have been erased. Reset the clock time and the timer settings.

When two timer settings overlap
If two timer settings are preset as in the following example, the recording of the event 2 will begin after the first recording is completely finished. Consequently, the event 2 will be cut off in the beginning of its recording.



This portion will be cut off.

AFTER TIMER RECORDING

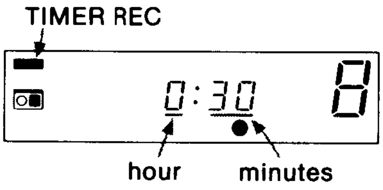
When a timer recording is finished, the setting (except the everyday setting) will be eliminated and the next timer settings will move up one event position each. For example, if you have preset 4 events, when the first timer recording is finished, the fourth event position will be vacant. If the TIMER SET button is pressed, "4" will appear in the window.

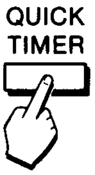
1-6. QUICK TIMER RECORDING

—To set the recording duration and to turn off the unit automatically

During recording, you can set the recording duration for up to 4 hours in units of 30 minutes by pressing the QUICK TIMER button. After the preset time has elapsed, recording stops and the recorder is turned off automatically.

1 Start recording.
2 Press the QUICK TIMER button to set the recording duration.
The TIMER REC indicator will appear.





Each time you press the QUICK TIMER button, the indication changes:

0 : 30 → 1 : 00 → 1 : 30 → 2 : 00 → ...3 : 30 ...→ 4 : 00

As the recording continues, the duration indication decreases minute by minute to 0:00 and the recording stops. The recorder is turned off automatically.

Note
When the TIMER REC indicator is displayed, no function of the recorder can be activated.

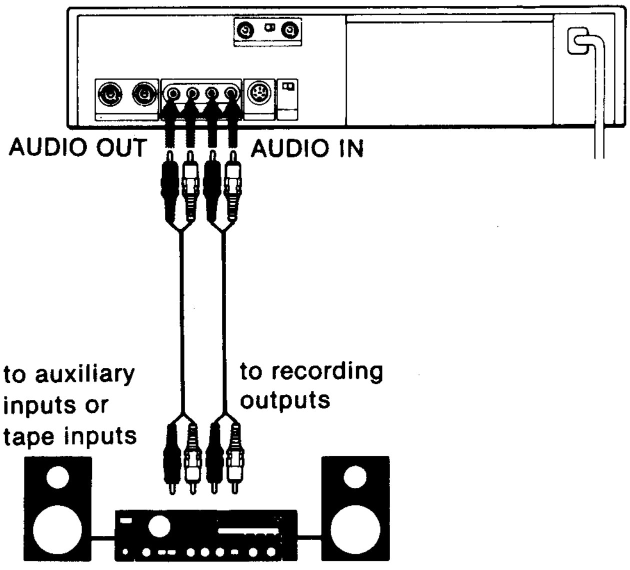
To extend the recording duration
The on-going recording duration can be extended simply by pressing the QUICK TIMER button.
The duration will be extended in units of 30 minutes with each pressing.
Example : When 2:25 is indicated,
2:25 → 2:30 → 3:00 ...

To cancel the quick timer function
Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off. The recorder will be turned off automatically after about a second.

1-7. BETA HI-FI AUDIO RECORDING

You can record only audio signals without recording pictures.

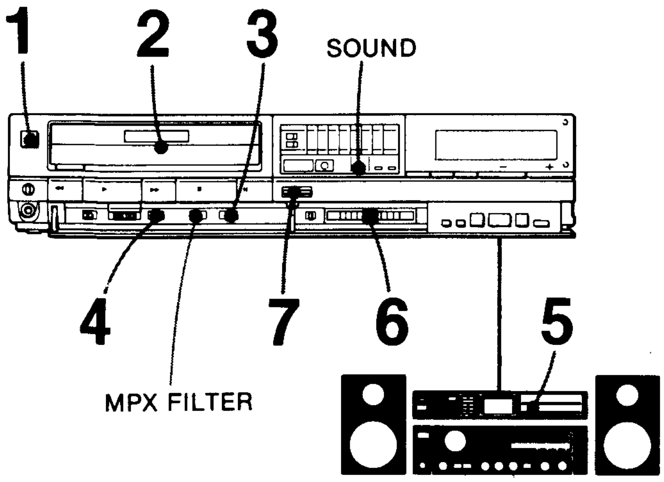
CONNECTION TO AN AUDIO SYSTEM



Stereo amplifier, receiver, etc.

Note
When the TV aerial input socket is connected to the recorder AERIAL OUT socket, the recorded TV programme's sound may not be heard if pictures are not recorded on the tape. Listen to the sound through the equipment connected to the AUDIO OUT jacks.

TO RECORD FROM THE AUDIO SYSTEM



1 Press the ON/STANDBY switch.
2 Insert a cassette.
3 Set the INPUT SELECT switch to LINE/PCM.
4 Set the BETA HIFI RECORD mode selector to SOUND.
  The SOUND lamp lights to show audio recording.
5 Turn on the power of the audio system and play the programme source to be recorded.
6 Adjust the recording level with the REC LEVEL controls.
  (See "RECORDING LEVEL ADJUSTMENT".)
7 Press the ● RECORD button. Recording will begin.

BETA HIFI MPX FILTER (multiplex) switch

When recording from an FM tuner, set this switch to ON to cut off the high-frequency signals which sometimes grate on the ear. To record without cutting the high frequencies, set this switch to OFF.

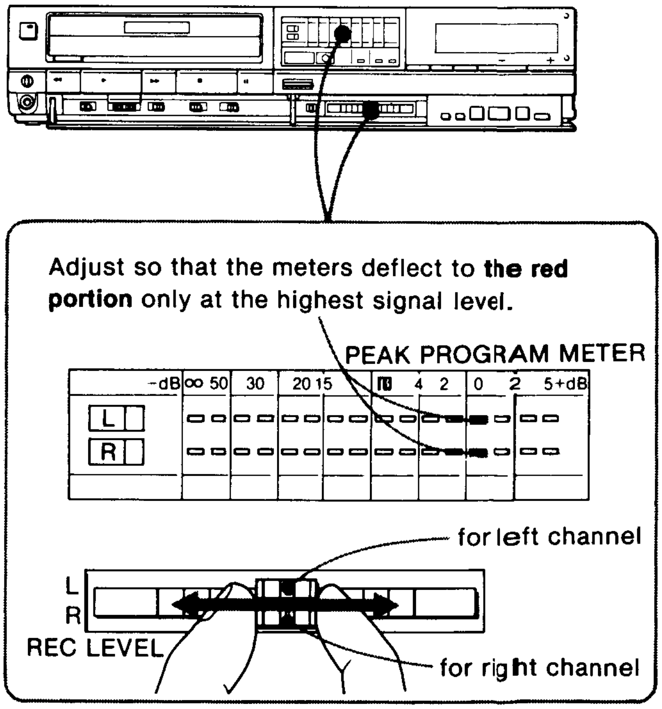
RECORDING LEVEL ADJUSTMENT

When recording on the Beta hi-fi system, the recording level of the left and right channels can be adjusted with the REC LEVEL controls.

In most cases, when you record TV programme sound, the proper recording level is obtained by setting the REC LEVEL controls at 5 (green position).

When you record a sound source with a wide dynamic range, manually adjusting the recording level may result in a better recording.

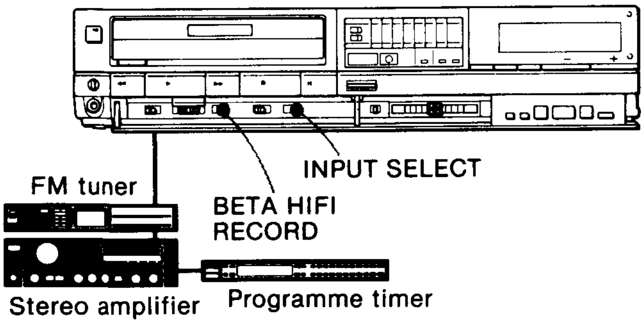
If the recording level setting is too high, the sound will be distorted, and if the setting is too low, a noisy recording will result. The recording level should be set as high as possible while avoiding distortion.



Adjust so that the meters deflect to **the red portion** only at the highest signal level.

TIMER-ACTIVATED AUDIO RECORDING

Use an optional programme timer for turning on/off the audio system.


FM tuner
INPUT SELECT
BETA HIFI RECORD
Stereo amplifier
Programme timer

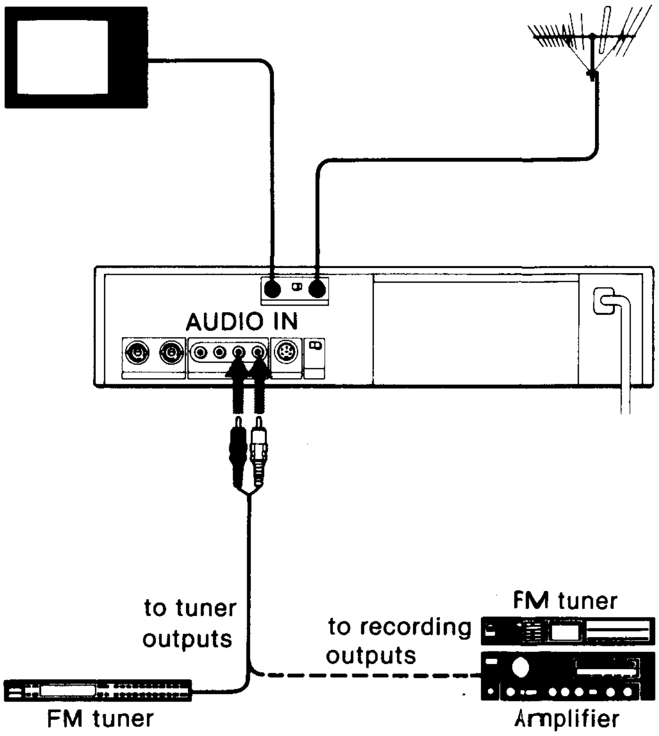
1 Make sure that the clock built into the recorder and the programme timer clock are set to the correct day and time.
2 Set the INPUT SELECT switch of the recorder to SIMUL.
3 Set the BETA HIFI RECORD mode selector to SOUND.
4 Preset the turn-on day and time, and the turn-off time in both timers.
For presetting the recorder timer, see page 12.

At the preset turn-on time, audio recording will start automatically and will stop at the preset turn-off time.

FM SIMULCAST RECORDING

By connecting an FM tuner to the AUDIO IN jacks when a TV aerial is connected, you can record the FM simulcast TV programmes (stereo sound transmitted from an FM radio station) while recording the TV programme pictures (video signals) from the TV aerial inputs.

Connection


AUDIO IN
to tuner outputs
to recording outputs
FM tuner
FM tuner
Amplifier

Recording
1 Tune in the station you wish on the recorder and the FM tuner.
2 Set the INPUT SELECT switch on the recorder to SIMUL.
3 Start recording.

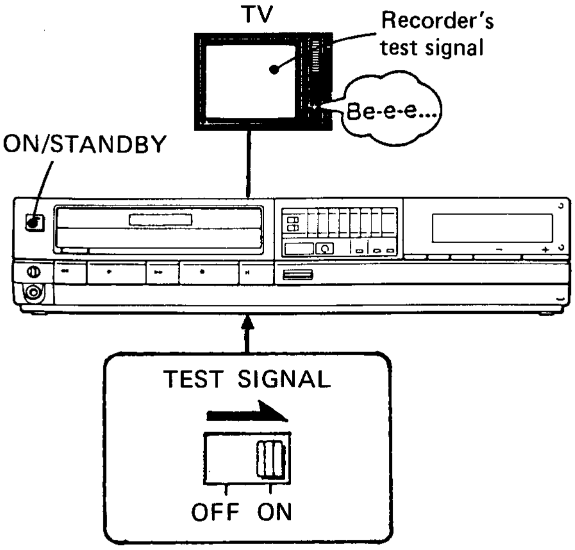
Note
Be sure to return the INPUT SELECT switch to TUNER after recording FM simulcast TV programmes. When the switch is set to SIMUL, the sound of TV programmes cannot be recorded.

1-8. ADJUSTING THE TV (EC MODEL)

One of the television programme positions must be adjusted to receive the signal from the recorder.
Note that the adjustment is not necessary, however, when the recorder is connected to the video/audio inputs on the TV receiver/monitor.

1 After making the connections, press the ON/STANDBY switch.
2 Make sure that the recorder is in the stop mode.
3 Set the TEST SIGNAL switch located at the rear of the recorder to ON. The test signal is transmitted on a channel between UHF channels E30 and E39.
4 Turn on the TV and select a programme position which is not being used to receive a TV station. Tune the channel until you see a clear black and white pattern on the TV screen and you hear a continuous tone. This is the recorder's test signal.

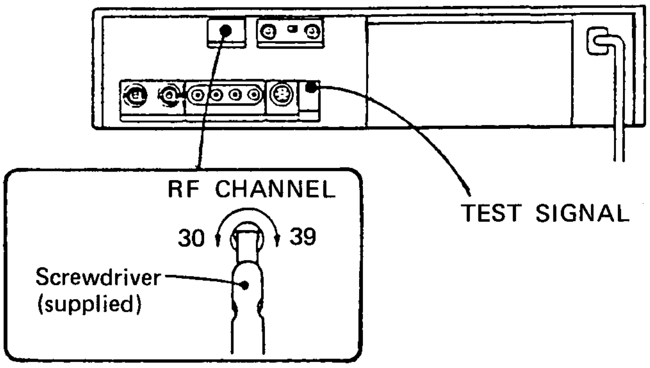
If you are not sure how to adjust your TV, please refer to the TV's instruction manual or consult your dealer.



Whenever you use the video recorder, you should set the TV to the programme position selected in this adjustment.

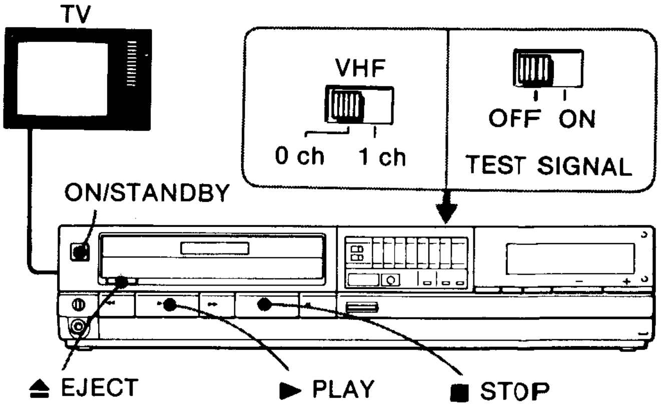
If the test picture is free of disturbance, the TV adjustment is complete. Set the TEST SIGNAL switch of OFF.

If the test picture is not free of disturbance
1 Reset the TEST SIGNAL switch to OFF.
2 Adjust the channel of the TV to a channel between UHF channels E30 and E39 with the tuning control or the fine tuning control on the TV, so that the TV screen shows no picture and so that a steady rustling sound or no sound is heard.
3 Set the TEST SIGNAL switch to ON again.
4 Slowly turn the RF CHANNEL screw on the back of the recorder with the supplied screwdriver, until you see an undistorted test pattern on the TV screen.
5 Now the TV adjustment is complete. Reset the TEST SIGNAL switch of OFF.



1-9. ADJUSTING THE TV (AS MODEL)

One of the television programme positions must be adjusted to receive the signal from the recorder.
Note that the adjustment is not necessary, however, when the recorder is connected to the video/audio inputs on the TV receiver/monitor.



Using the supplied demonstration video cassette
1 Set the RF unit selector located at the rear of the recorder to VHF 0 ch or 1 ch, whichever channel is not active in your area.
2 Press the ON/STANDBY switch.
3 Insert the supplied demonstration video cassette with the round window to the left.
4 Press the ▶ PLAY button.
5 Turn on the TV.
6 Set the TV to either VHF channel 0 or 1 to agree with the setting of the RF unit selector. The tape programme will be displayed on the TV screen. If the display is not clear, fine-tune the channel on the TV.

After adjustment, check that the display on the screen changes when you stop the tape by pressing the ■ STOP button on the recorder. If the programme does not change, repeat the preceding steps. (To eject the cassette, press the ≜ EJECT button.)

Using the test signal
1 Set the RF unit selector located at the rear of the recorder to VHF 0 ch 1 ch, whichever channel is not active in your area.

2 Press the ON/STANDBY switch.
3 Make sure that the recorder is in the stop mode.
4 Set the TEST SIGNAL switch located at the rear of the recorder to ON. The test signal is transmitted on the VHF channel 0 or 1 to agree with the setting of the RF unit selector.
5 Turn on the TV and select a programme position which is not being used to receive a TV station. Using automatic tuning, tune the channel until you see a clear black and white pattern on the TV screen and you hear a continuous tone. This is the recorder's test signal.
6 Set the TEST SIGNAL switch to OFF.

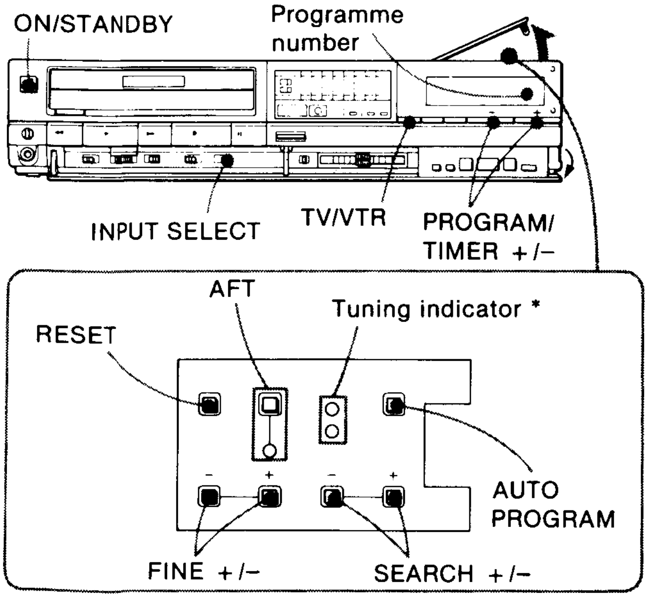
- If you are not sure how to adjust your TV, please refer to the TV's instruction manual or consult your dealer.

Whenever you use this recorder, you should set the TV to the programme position selected in this adjustment.

1-10. TV STATION PROGRAMMING

Automatic and manual programming are available. Automatic programming automatically presets receivable stations from the lowest frequency to the highest. Manual programming is useful for presetting selected stations in any desired sequence.

Before programming
- Turn on the recorder by pressing the ON/STANDBY switch.
- Press the TV/VTR button so that the VTR indicator appears in the display window.
- Set the INPUT SELECT switch to TUNER.



AUTOMATIC PROGRAMMING

Press the AUTO PROGRAM button. Up to 30 receivable stations will be preset one by one from programme position 1. When no more stations can be located, programme number "1" will light on the programme indicator and automatic programming will stop.

MANUAL PROGRAMMING

1 Press the + or – PROGRAM/TIMER button to select the programme position.
   + for a higher-numbered programme position
   – for a lower-numbered programme position

2 Press the + SEARCH button to locate a station with higher frequency and the – SEARCH button to locate a station with lower frequency.
   When a station has been received, the search will stop. Press the + or – SEARCH button again, until the desired station is received.

Repeat these steps for all desired stations.

FINE TUNING OF A WEAK STATION

If the picture on a particular programme position is not acceptable, keep the + or – FINE button pressed until the picture becomes clearer. When either of the FINE buttons is pressed, the AFT of the selected station is deactivated and the AFT lamp goes off. To view this particular station, keep the AFT deactivated. (Do not press the AFT button.)
When other memorized stations are selected, the AFT automatically activates.

ELIMINATING NOISE ON UNUSED PROGRAMME POSITIONS

Simply press the RESET button. The annoying noise will be eliminated.

***Tuning indicator (EC model)**
The tuning indicator lights to show the current tuning band.
V: E2 - E4, E5 - E12 and Cable TV S1 - S3, M1 - M10 and U11 - U20 channels.
U: E21 - E68 channels

Note: Cable TV channels are receivable on the SL-HF150ES only.

***Tuning indicator (AS model)**
The tuning indicator lights to show the current tuning band.
V: 0 - 11 channels
U: 28 - 34 and 39 - 63 channels

1-11. CLOCK SETTING

When you connect the mains lead to a mains outlet, the clock indicates "0 : 00" with the two dots blinking.

Example: To set the clock to 7 : 35 p.m. (19 : 35) on Tuesday

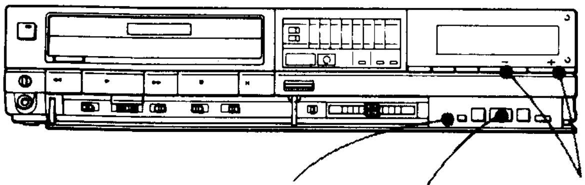
Time indication

AM			
12 : 00 (midnight)	1 : 00		11 : 00
↓ 0:00	↓ 1:00	.....	↓ 11:00

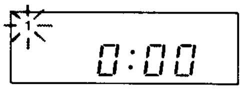
PM					
12 : 00 (noon)	1 : 00	2 : 00		10 : 00	11 : 00
↓ 12:00	↓ 13:00	↓ 14:00	.....	↓ 22:00	↓ 23:00

Day indication

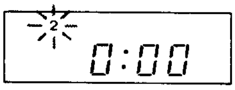
MON (Monday)	TUE. (Tuesday)	WED (Wednesday)	THU (Thursday)	FRI (Friday)	SAT (Saturday)	SUN (Sunday)
↓ 1	↓ 2	↓ 3	↓ 4	↓ 5	↓ 6	↓ 7



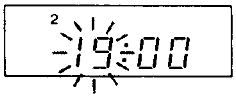
1 Press CLOCK SET.



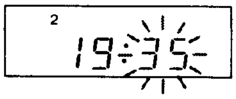
2 Set the day by pressing + or –.



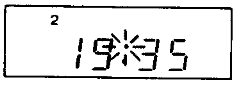
3 Press NEXT and set the hour by pressing + or – .



4 Press NEXT and set the minute by pressing + or – .



5 With an announced time signal, press NEXT.
The clock now starts operating, showing the correct time.



NEXT button
Each time the NEXT button is pressed, the item to be set blinks to let you know the setting order.

+/– buttons
The + and – PROGRAM/TIMER buttons can be pressed in two ways.

When you hold a button down, the digits will advance continously until the button is released.

When you press and immediately release a button, the digits will advance by one.

To change the actual clock setting
Press the CLOCK SET button and repeat the clock setting procedure from step 1.

Note
If you have pressed the CLOCK SET button inadvertently, press the NEXT button enough times until the dots of the colon blink.

When power has been interrupted, the time indication "0 : 00" blinks, showing that the clock must be reset.

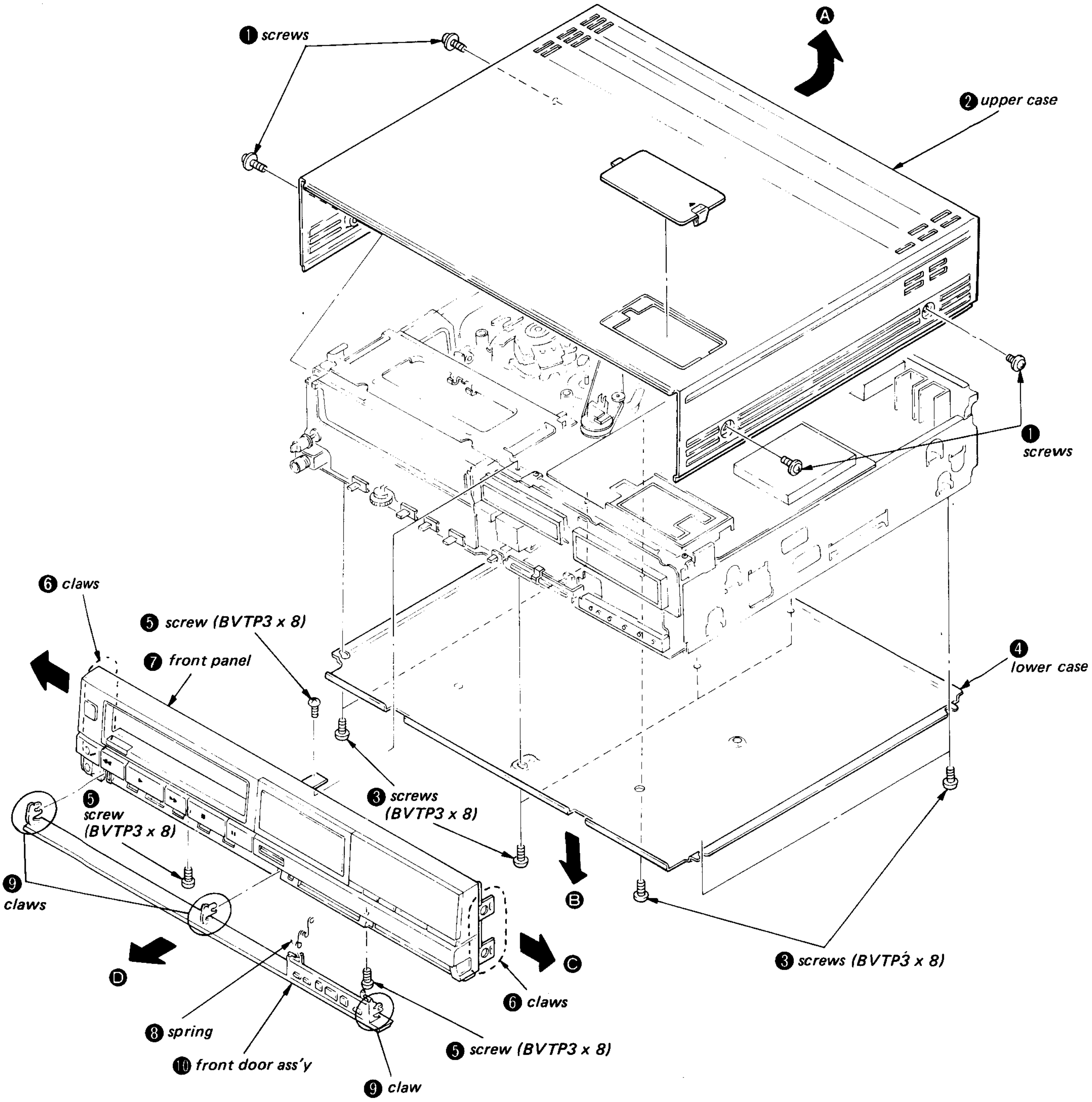
SECTION 2
DISASSEMBLY

2-1. DISASSEMBLY OF CABINET

1) Remove the four case set screws ❶.
2) Remove the upper case ❷ in the direction shown by the arrow Ⓐ.
3) Remove the eight screws (BVTP3 x 8) ❸.
4) Remove the lower case ❹ in the direction shown by the arrow Ⓑ.
5) Remove the three screws (BVTP3 x 8) ❺.
6) Remove the four claws ❻ in the direction shown by the arrow Ⓒ, then remove the front panel ❼ in the direction shown by the arrow Ⓓ.
7) Remove the spring ❽.
8) Remove the three claws ❾ in the direction shown by the arrow Ⓓ, then remove the front door assembly ❿.

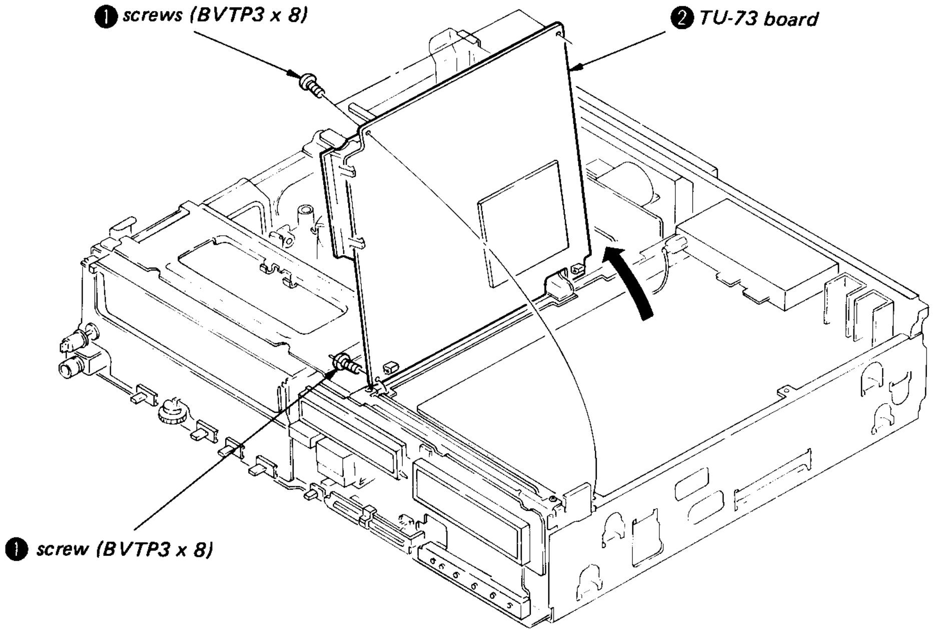
Note:

Follow the disassembly procedure in the numerical order given.


❶ screws
Ⓐ
❷ upper case
❶ screws
❻ claws
❺ screw (BVTP3 x 8)
❼ front panel
❹ lower case
❸ screws (BVTP3 x 8)
❺ screw (BVTP3 x 8)
❾ claws
Ⓑ
Ⓓ
Ⓒ
❸ screws (BVTP3 x 8)
❻ claws
❽ spring
❺ screw (BVTP3 x 8)
❿ front door ass'y
❾ claw

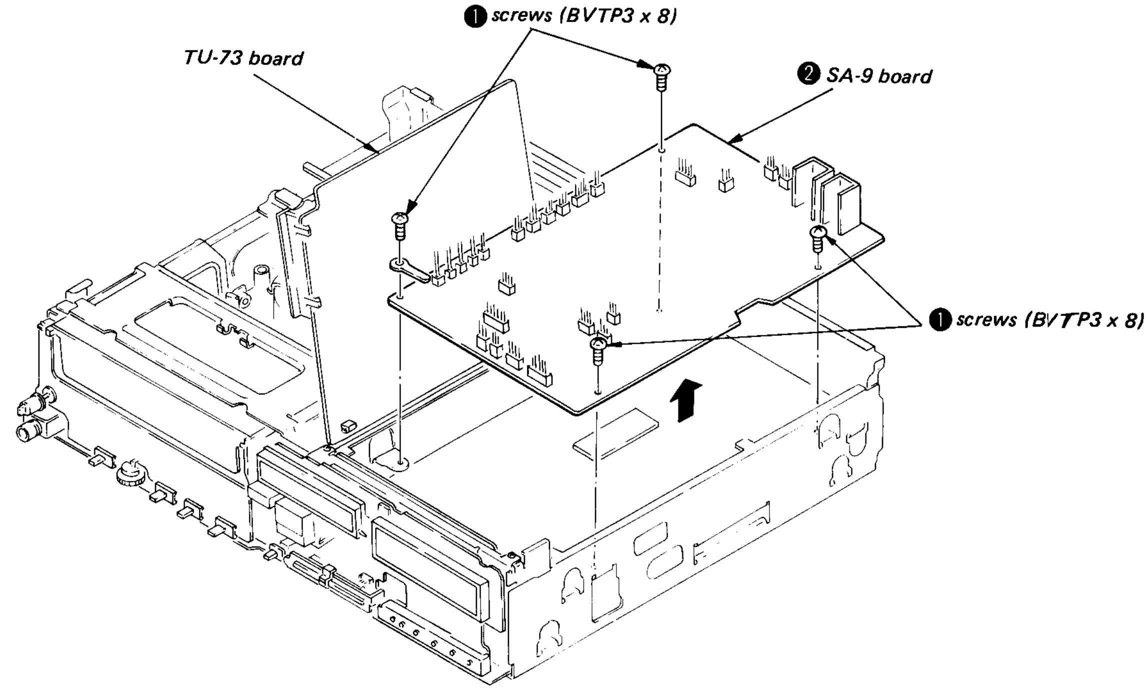
2-2. REMOVAL OF THE TU-73 BOARD

1) Remove the three screws (BVTP3 x 8) ❶.
2) Remove the TU-73 board ❷ in the direction shown by the arrow.


❶ screws (BVTP3 x 8)
❷ TU-73 board
❶ screw (BVTP3 x 8)

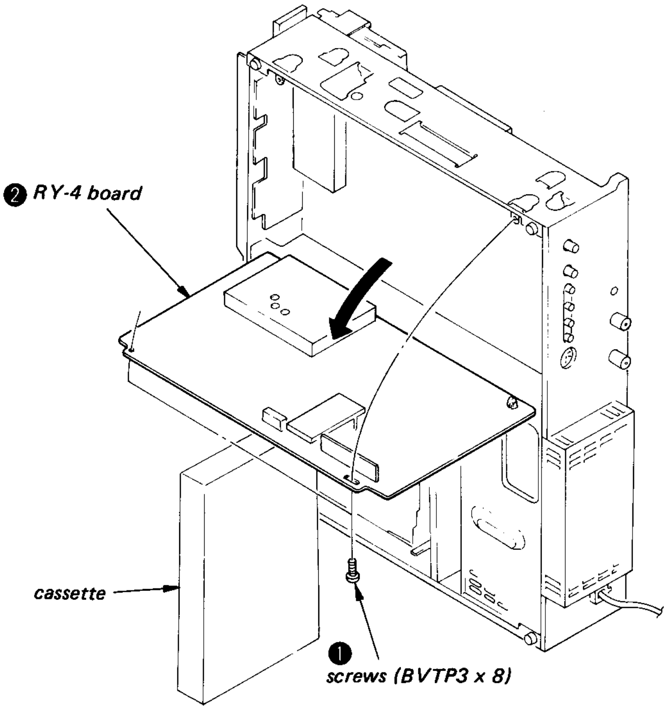
2-3. REMOVAL OF THE SA-9 BOARD

1) Remove the TU-73 board.
(Refer to section 2-2 REMOVAL OF THE TU-73 BOARD.)
2) Remove the four screws (BVTP3 x 8) ❶.
3) Remove the SA-9 board ❷ in the direction shown by the arrow.


❶ screws (BVTP3 x 8)
TU-73 board
❷ SA-9 board
❶ screws (BVTP3 x 8)

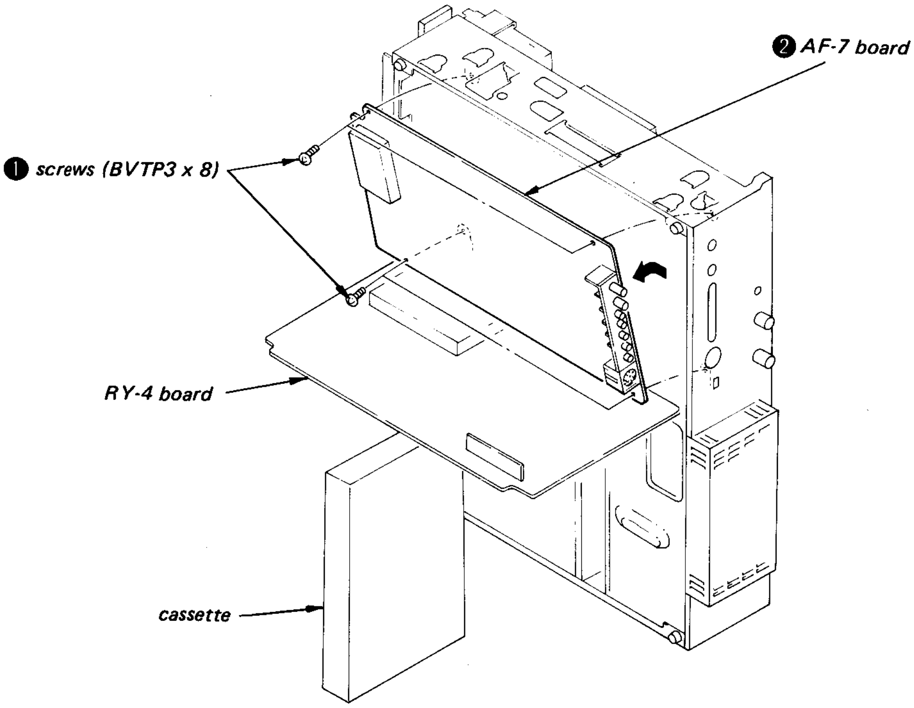
2-4. REMOVAL OF THE RY-4 BOARD

1) Stand the set with the left side panel on the bottom.
2) Remove the two screws (BVTP3 x 8) ❶.
3) Remove the RY-4 board ❷ in the direction shown by the arrow and rest it on a cassette.


❷ RY-4 board
cassette
❶ screws (BVTP3 x 8)

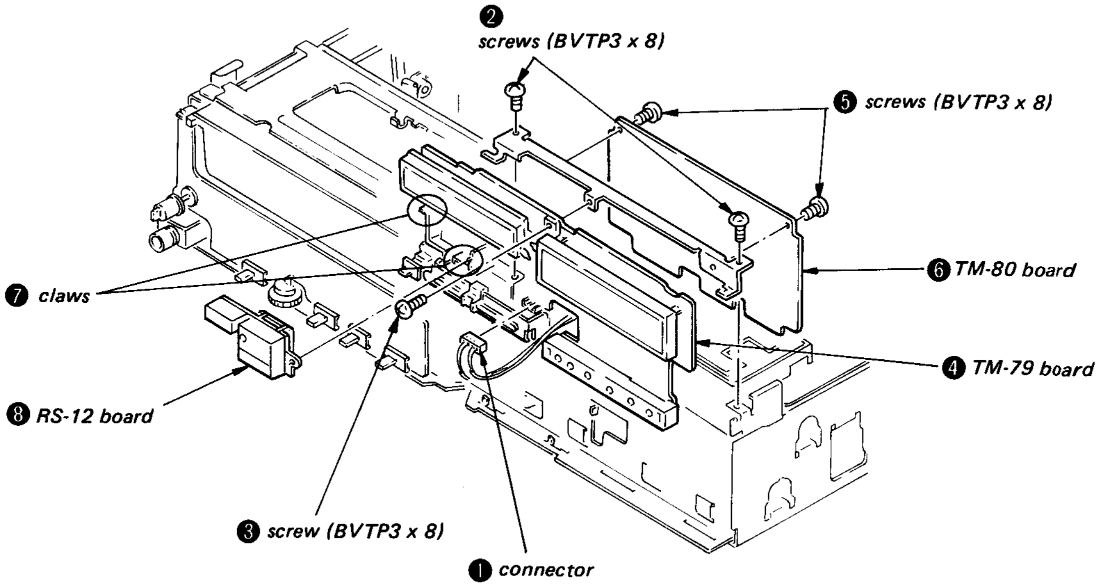
2-5. REMOVAL OF THE AF-7 BOARD

1) Remove the RY-4 board.
(Refer to section 2-4 REMOVAL OF THE RY-4 BOARD.)
2) Remove the four screws (BVTP3 x 8) ❶.
3) Remove the AF-7 board ❷ in the direction shown by the arrow.


❷ AF-7 board
❶ screws (BVTP3 x 8)
RY-4 board
cassette

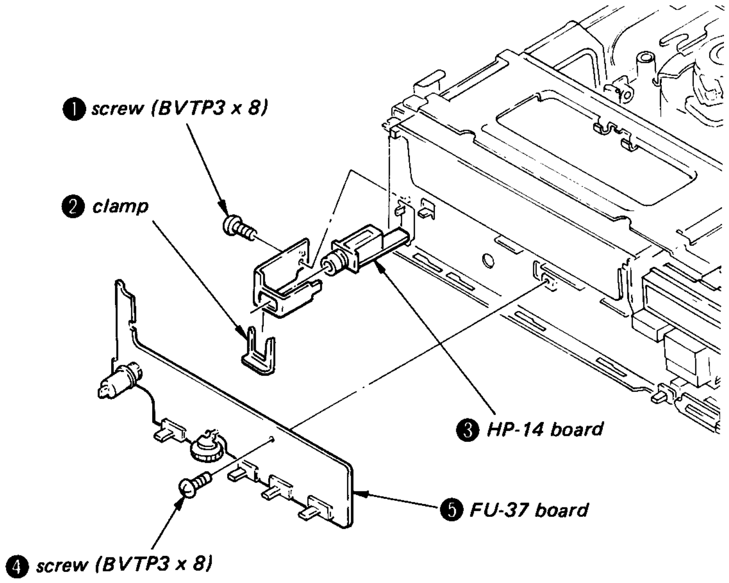
2-6. REMOVAL OF THE TIMER BLOCK

1) Pull out the connector ❶.
2) Remove the screws (BVTP3 x 8) ❷, ❸.
3) Remove the TM-79 board ❹.
4) Remove the two screws (BVTP3 x 8) ❺.
5) Remove the TM-80 board ❻.
6) Remove the three claws ❼ and then remove the RS-12 board ❽.


❷ screws (BVTP3 x 8)
❺ screws (BVTP3 x 8)
❻ TM-80 board
❼ claws
❹ TM-79 board
❽ RS-12 board
❸ screw (BVTP3 x 8)
❶ connector

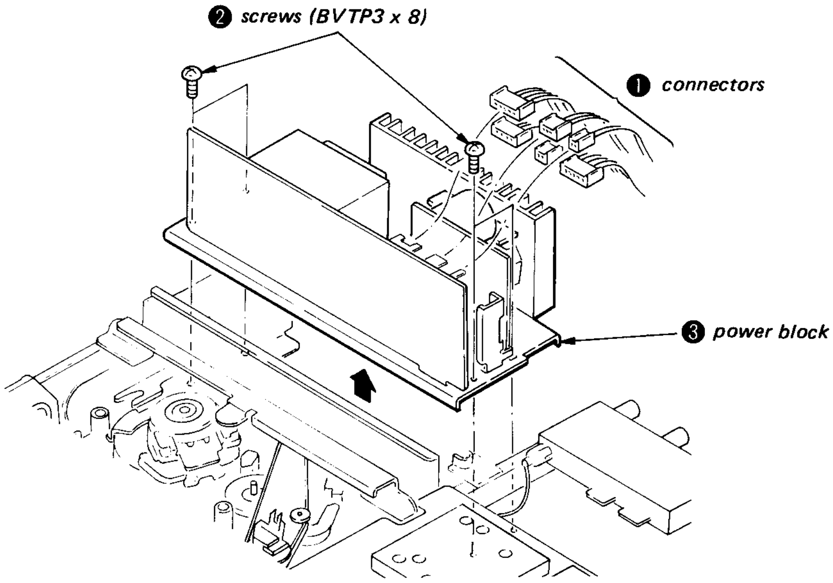
2-7. REMOVAL OF THE FU-37 AND HP-14 BOARDS

1) Remove the screw (BVTP3 x 8) ❶.
2) Remove the clamp ❷.
3) Remove the HP-14 board ❸.
4) Remove the screw (BVTP3 x 8) ❹.
5) Remove the FU-37 board ❺.


❶ screw (BVTP3 x 8)
❷ clamp
❸ HP-14 board
❺ FU-37 board
❹ screw (BVTP3 x 8)

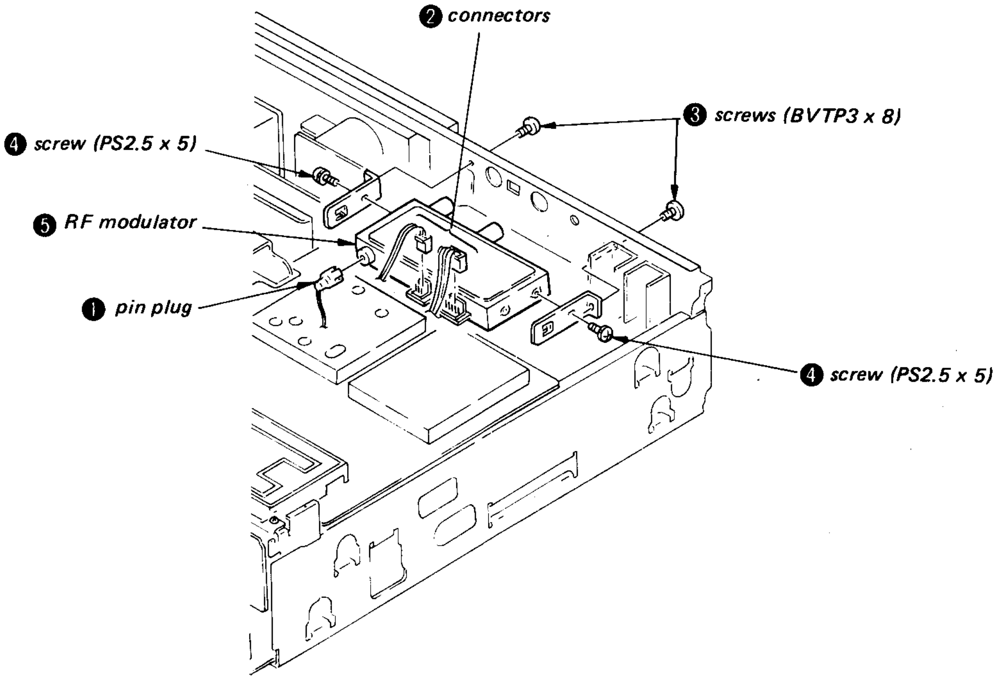
2-8. REMOVAL OF THE POWER BLOCK

1) Pull out the six connectors ❶.
2) Remove the two screws (BVTP3 x 8) ❷.
3) Remove the power block ❸ in the direction shown by the arrow.


❷ screws (BVTP3 x 8)
❶ connectors
❸ power block

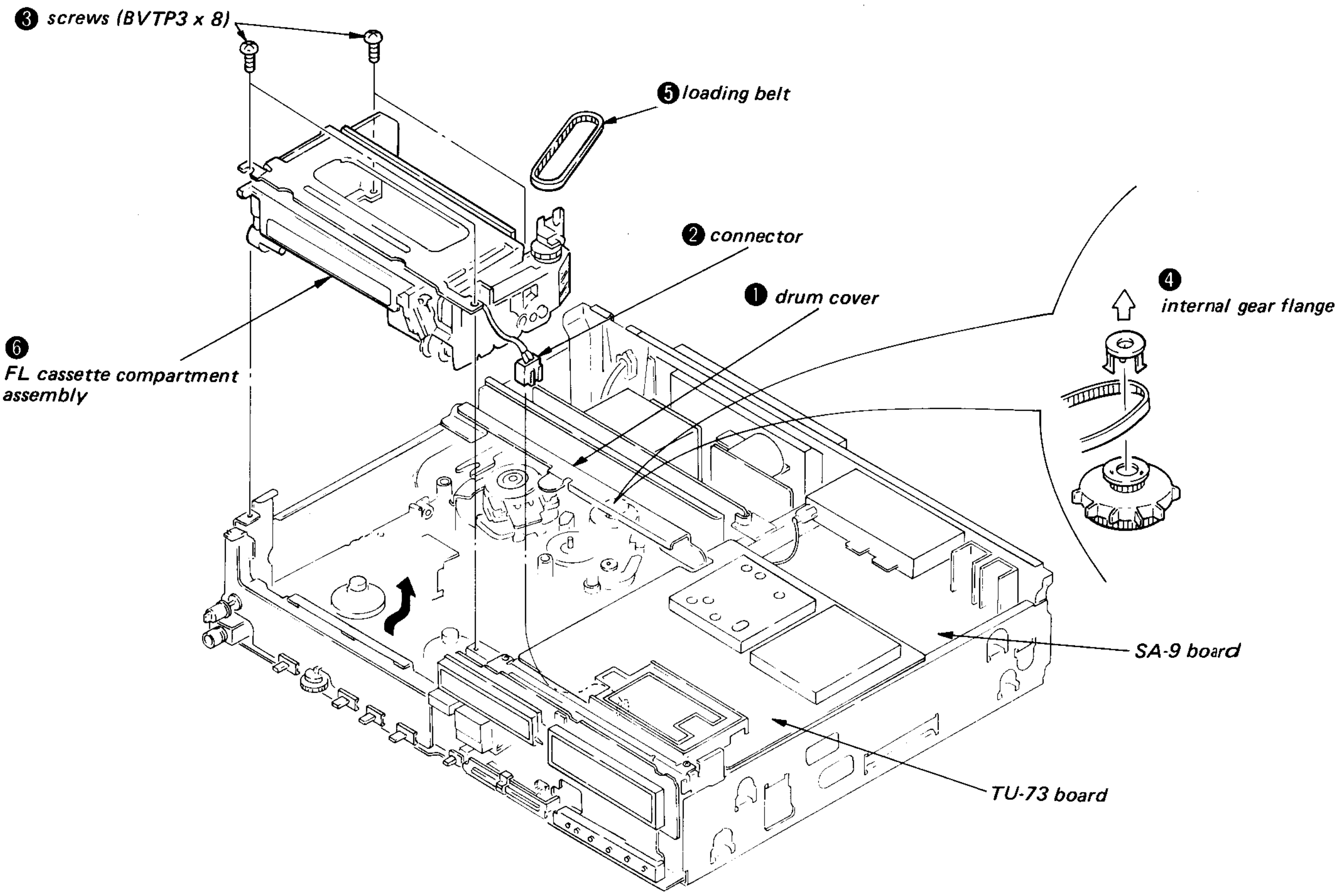
2-9. REMOVAL OF THE RF MODULATOR

1) Pull out the pin plug ❶ and the two connectors ❷.
2) Remove the two screws (BVTP3 x 8) ❸ and the two screws (PS2.5 x 5) ❹.
3) Remove the RF modulator ❺.


❷ connectors
❸ screws (BVTP3 x 8)
❹ screw (PS2.5 x 5)
❺ RF modulator
❶ pin plug
❹ screw (PS2.5 x 5)

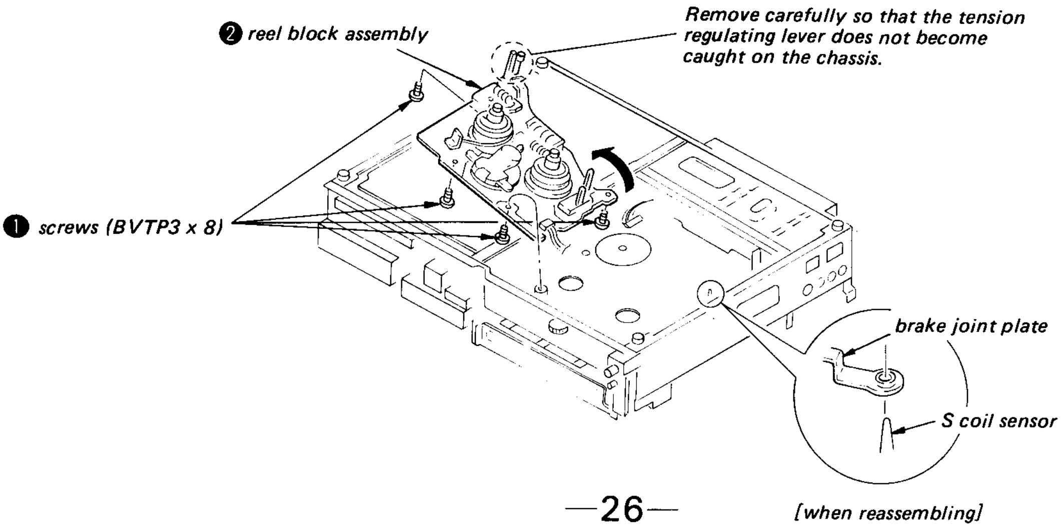
2-10. REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY

1) Remove the TU-73 board.
   (Refer to section 2-2 REMOVAL OF THE TU-73 BAORD.)
2) Remove the drum cover ❶.
3) Pull out the connector ❷ from the SA-9 board.
4) Remove the four screws (BVTP3 x 8) ❸.
5) Remove the internal gear flange ❹.
6) Remove the loading belt ❺.
7) Remove the FL cassette compartment assembly ❻ in the direction shown by the arrow.


❸ screws (BVTP3 x 8)
❺ loading belt
❷ connector
❶ drum cover
❹ internal gear flange
❻ FL cassette compartment assembly
SA-9 board
TU-73 board

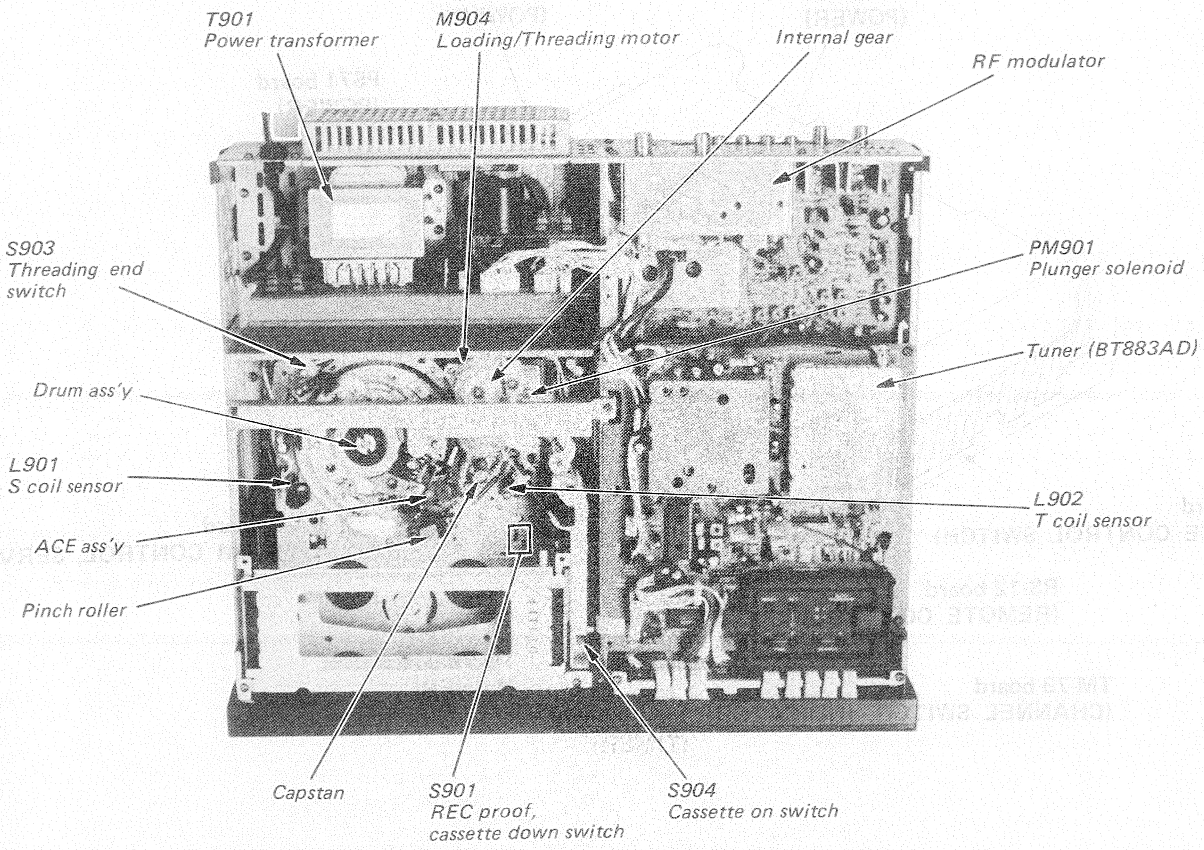
2-11. REMOVAL OF THE REEL BLOCK ASSEMBLY

1) Place the set upside down.
2) Remove the four screws (BVTP3 x 8) ❶.
3) Remove the reel block assembly ❷ in the direction shown by the arrow.

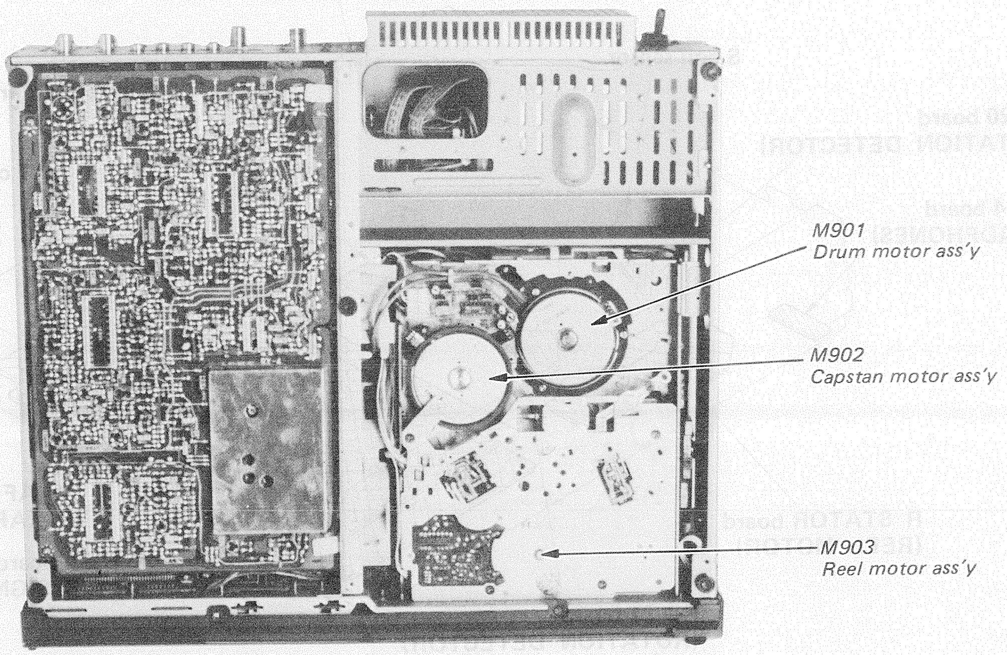

❷ reel block assembly
Remove carefully so that the tension regulating lever does not become caught on the chassis.
❶ screws (BVTP3 x 8)
brake joint plate
S coil sensor
[when reassembling]

2-12. INTERNAL VIEWS

– Top Side –

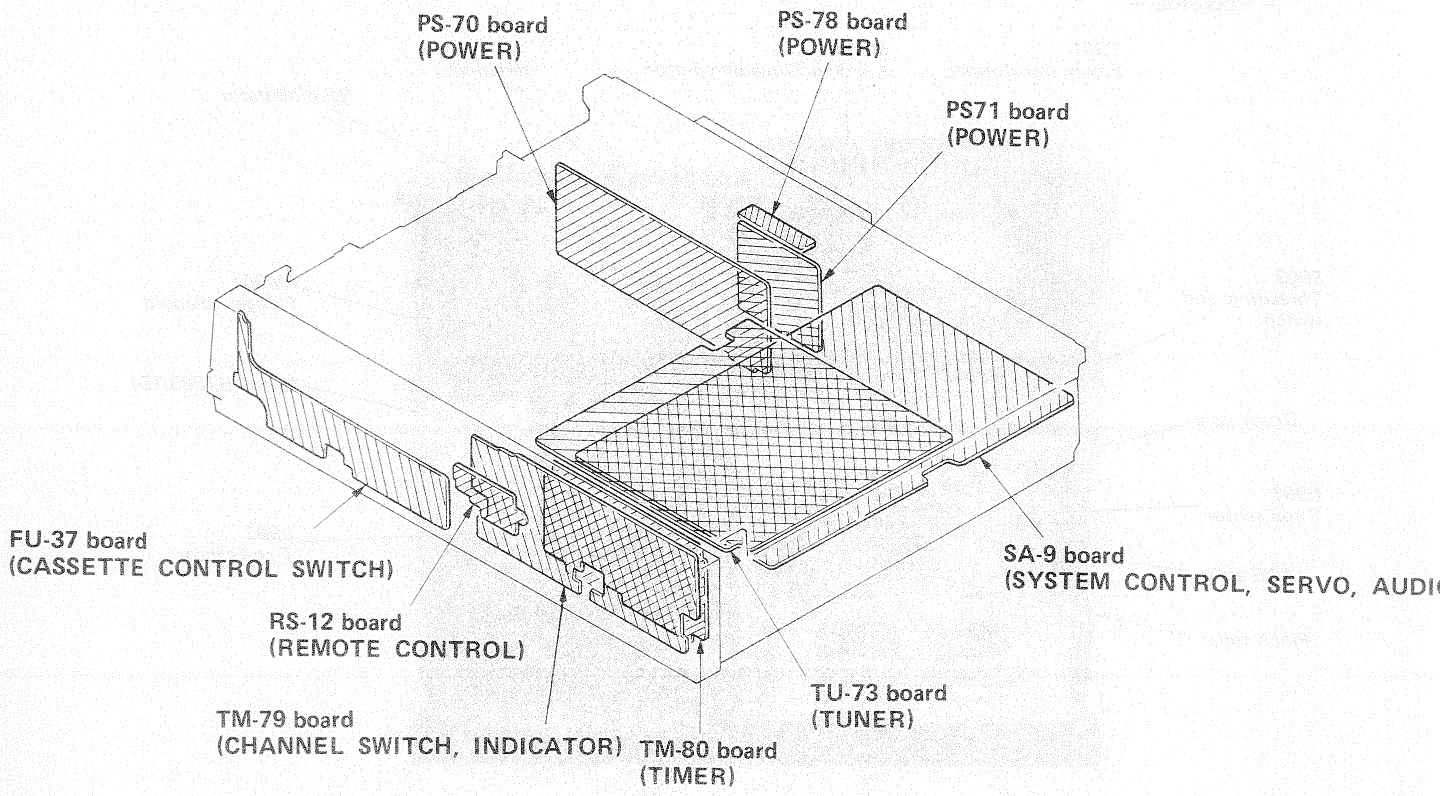

T901
Power transformer
M904
Loading/Threading motor
Internal gear
RF modulator
S903
Threading end switch
PM901
Plunger solenoid
Tuner (BT883AD)
Drum ass'y
L901
S coil sensor
L902
T coil sensor
ACE ass'y
Pinch roller
Capstan
S901
REC proof,
cassette down switch
S904
Cassette on switch

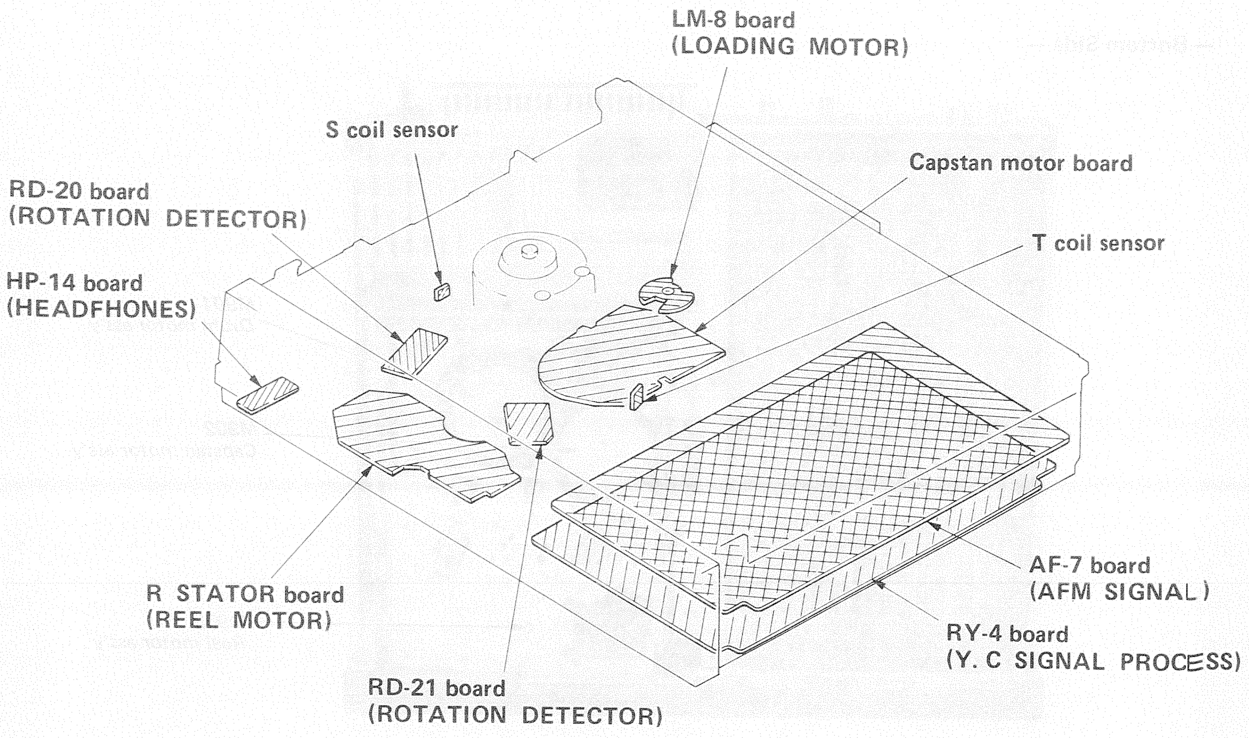
– Bottom Side –


M901
Drum motor ass'y
M902
Capstan motor ass'y
M903
Reel motor ass'y

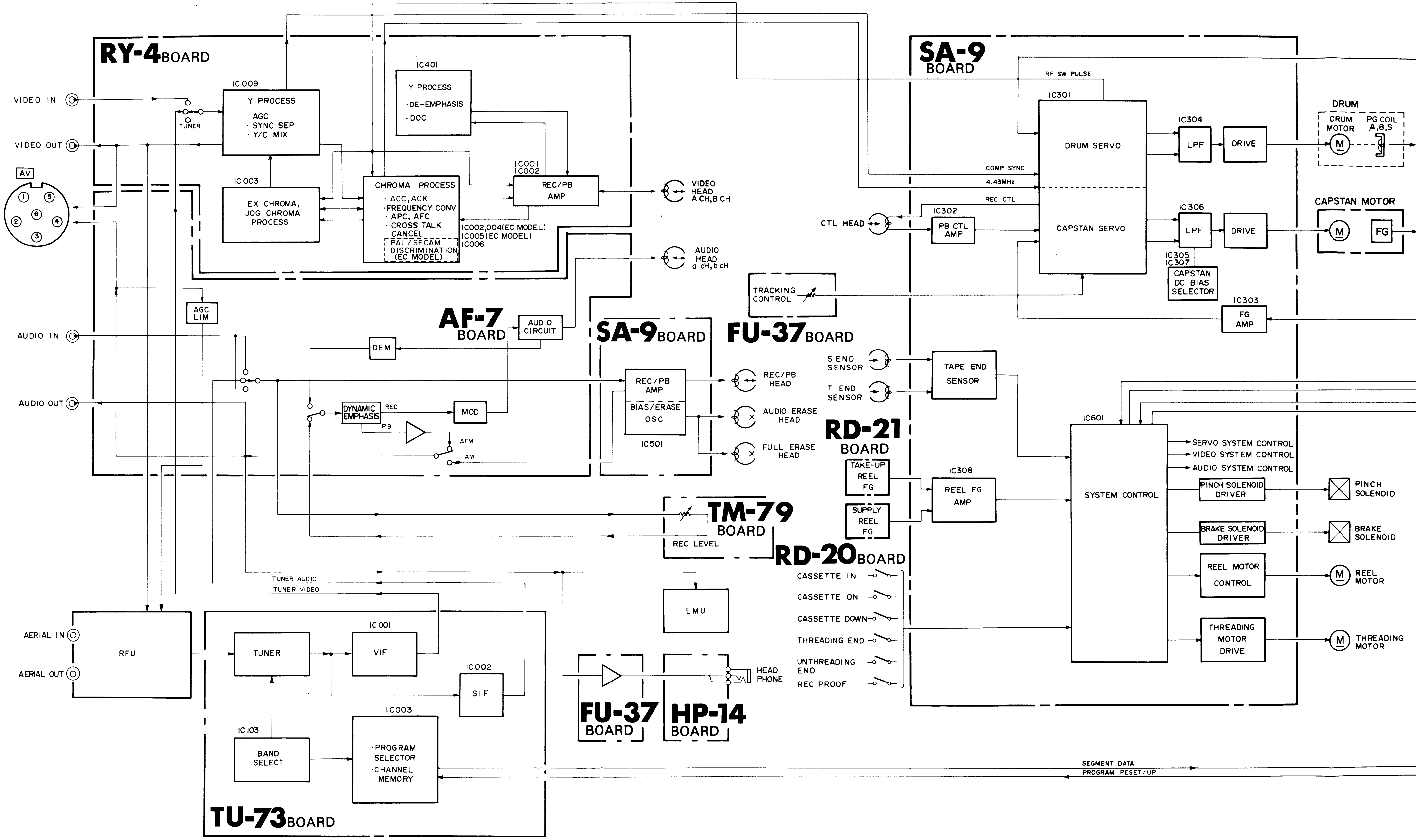
SECTION 3
DIAGRAMS

3-1. CIRCUIT BOARDS LOCATION

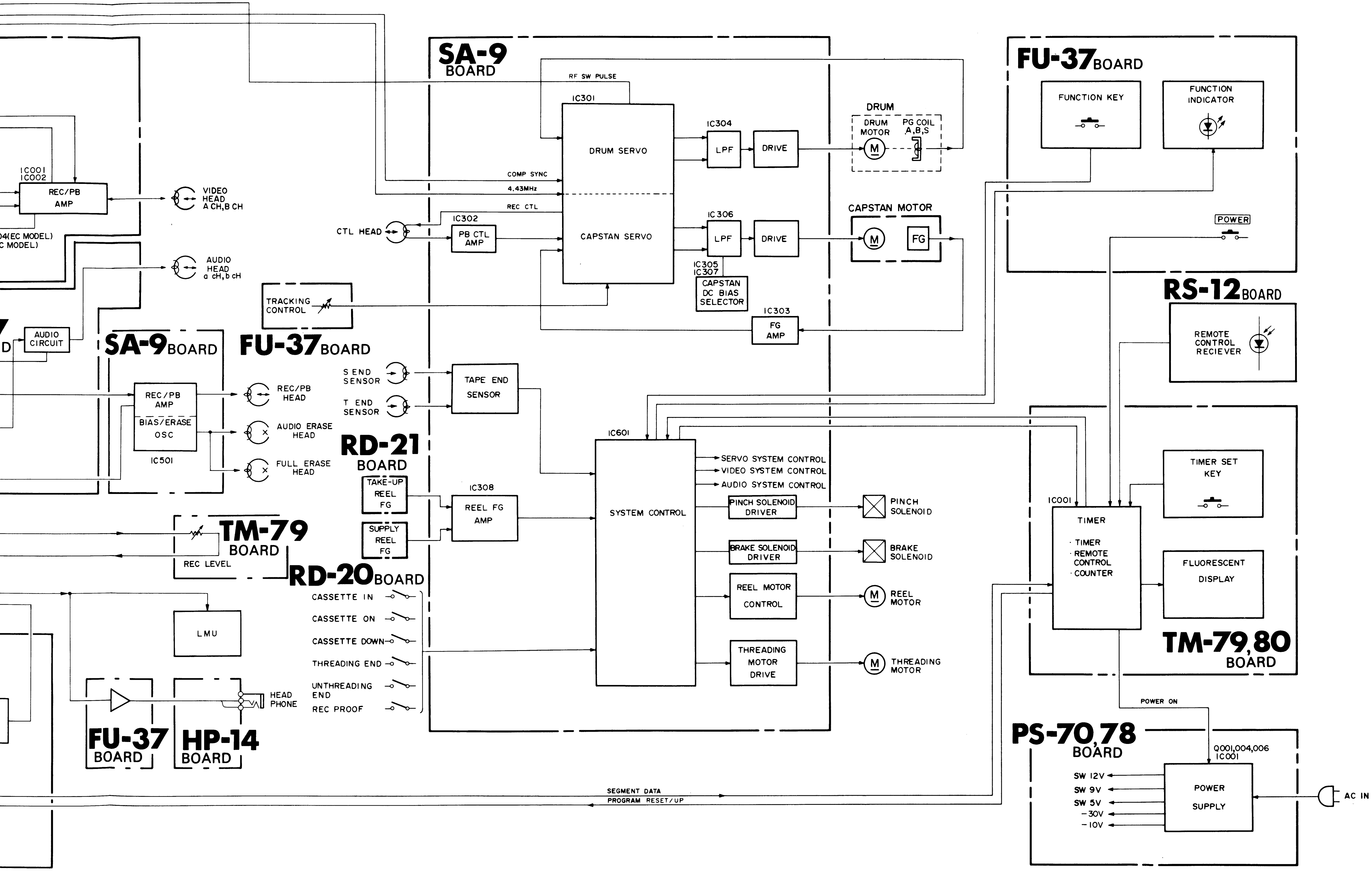

PS-70 board
(POWER)
PS-78 board
(POWER)
PS71 board
(POWER)
FU-37 board
(CASSETTE CONTROL SWITCH)
SA-9 board
(SYSTEM CONTROL, SERVO, AUDI
RS-12 board
(REMOTE CONTROL)
TU-73 board
(TUNER)
TM-79 board
(CHANNEL SWITCH, INDICATOR)
TM-80 board
(TIMER)


LM-8 board
(LOADING MOTOR)
S coil sensor
Capstan motor board
RD-20 board
(ROTATION DETECTOR)
T coil sensor
HP-14 board
(HEADFHONES)
AF-7 board
(AFM SIGNAL)
R STATOR board
(REEL MOTOR)
RY-4 board
(Y. C SIGNAL PROCESS)
RD-21 board
(ROTATION DETECTOR)

3-2. OVERALL BLOCK DIAGRAM

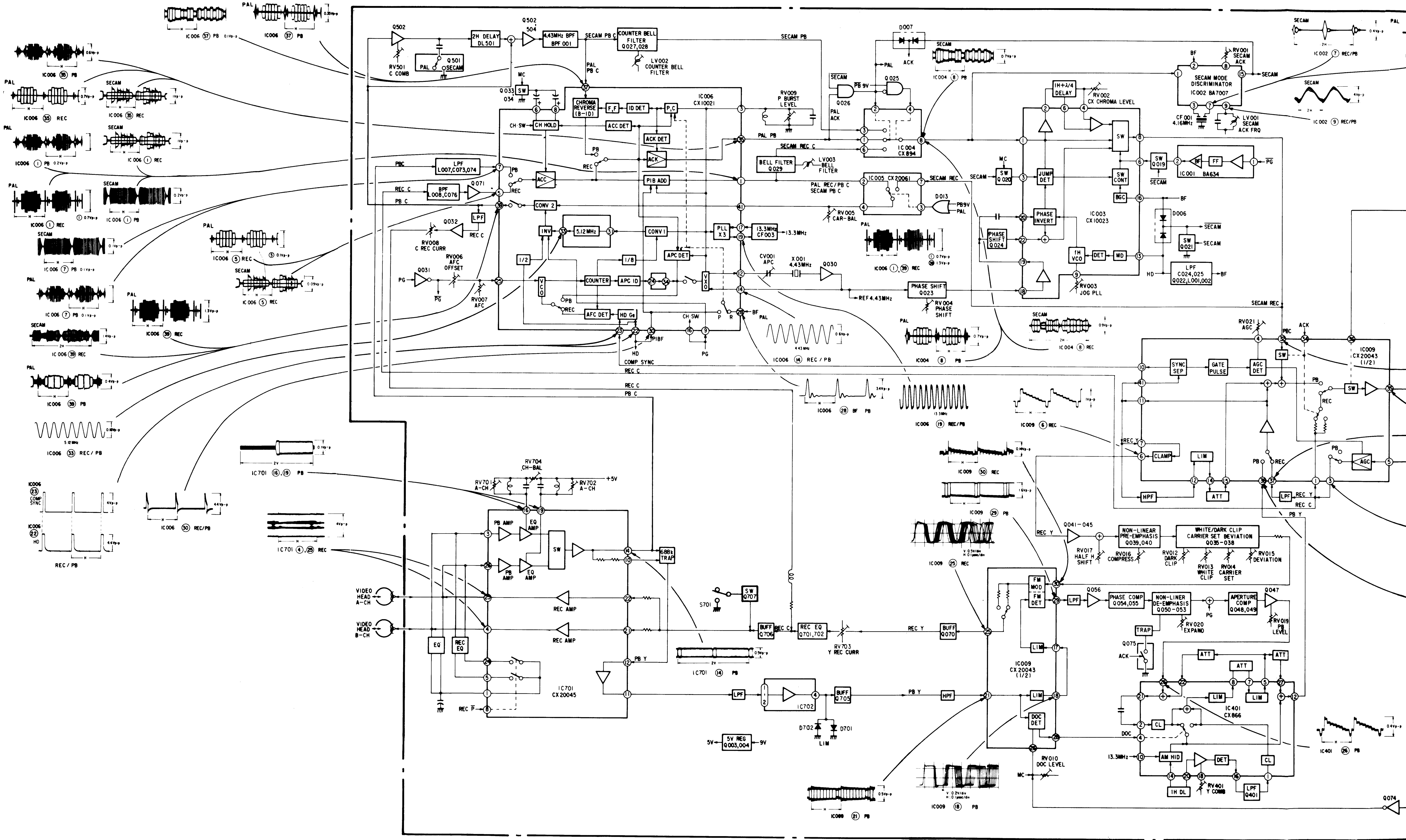


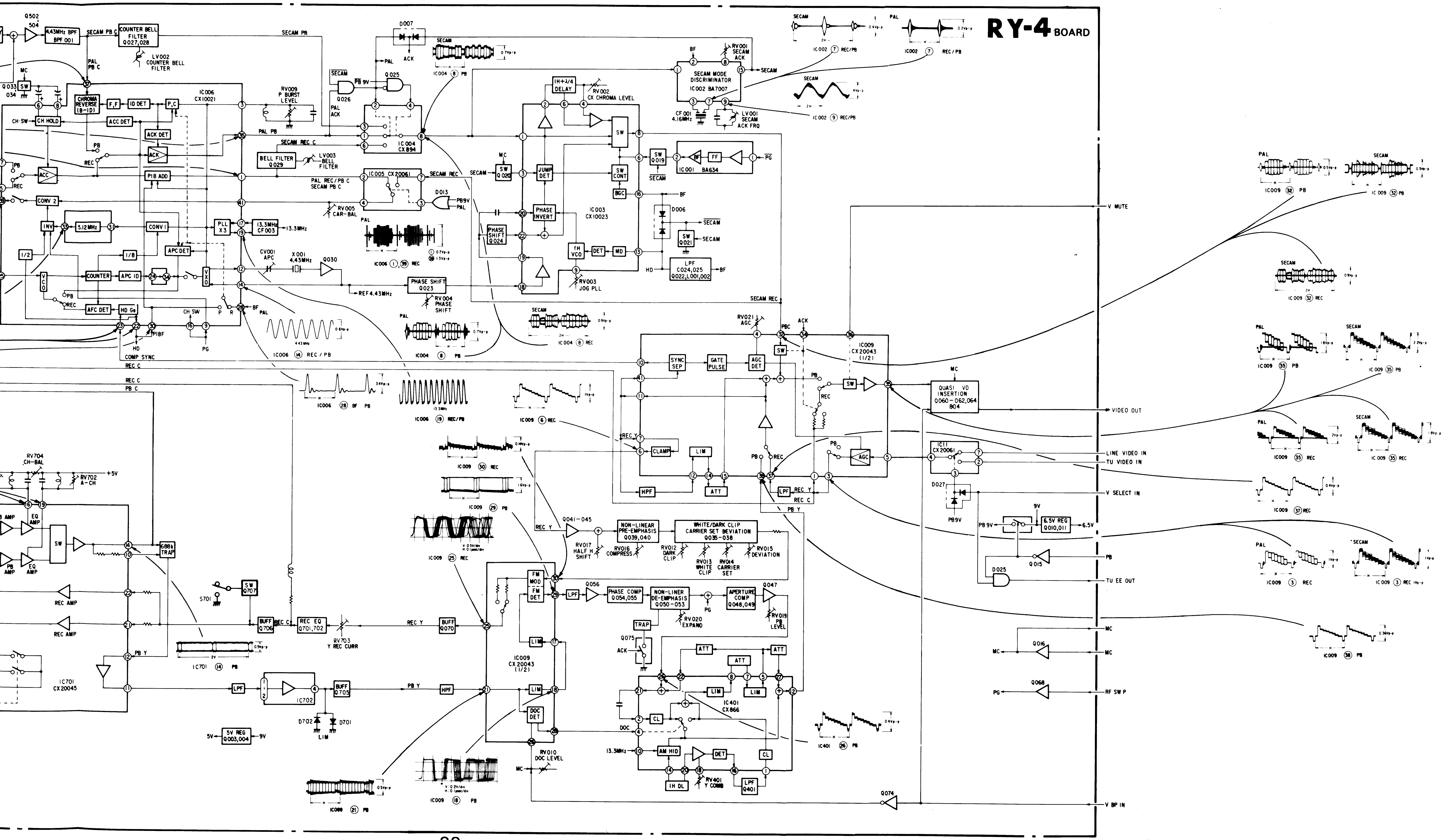
RY-4 BOARD
VIDEO IN
VIDEO OUT
TUNER
IC009
Y PROCESS
· AGC
· SYNC SEP
· Y/C MIX
IC401
Y PROCESS
·DE-EMPHASIS
·DOC
IC003
EX CHROMA, JOG CHROMA PROCESS
CHROMA PROCESS
· ACC, ACK
·FREQUENCY CONV
· APC, AFC
· CROSS TALK CANCEL
PAL/SECAM DISCRIMINATION (EC MODEL)
IC002,004(EC MODEL)
IC005(EC MODEL)
IC006
IC001
IC002
REC/PB AMP
VIDEO HEAD A CH,B CH
AUDIO HEAD a cH, b cH
AV
AGC LIM
AUDIO IN
AUDIO OUT
AF-7 BOARD
AUDIO CIRCUIT
DEM
DYNAMIC EMPHASIS
REC
PB
MOD
AFM
AM
SA-9 BOARD
REC/PB AMP
BIAS/ERASE OSC
IC501
REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
FU-37 BOARD
TRACKING CONTROL
TM-79 BOARD
REC LEVEL
TUNER AUDIO
TUNER VIDEO
LMU
AERIAL IN
AERIAL OUT
RFU
TU-73 BOARD
TUNER
IC001
VIF
IC002
SIF
IC103
BAND SELECT
IC003
·PROGRAM SELECTOR
·CHANNEL MEMORY
FU-37 BOARD
HP-14 BOARD
HEAD PHONE
RD-21 BOARD
S END SENSOR
T END SENSOR
TAKE-UP REEL FG
SUPPLY REEL FG
RD-20 BOARD
CASSETTE IN
CASSETTE ON
CASSETTE DOWN
THREADING END
UNTHREADING END
REC PROOF
SA-9 BOARD
RF SW PULSE
IC301
DRUM SERVO
CAPSTAN SERVO
COMP SYNC
4.43MHz
REC CTL
CTL HEAD
IC302
PB CTL AMP
IC304
LPF
DRIVE
IC306
LPF
DRIVE
IC305
IC307
CAPSTAN DC BIAS SELECTOR
IC303
FG AMP
DRUM
DRUM MOTOR
PG COIL A,B,S
M
CAPSTAN MOTOR
M
FG
TAPE END SENSOR
IC308
REEL FG AMP
IC601
SYSTEM CONTROL
SERVO SYSTEM CONTROL
VIDEO SYSTEM CONTROL
AUDIO SYSTEM CONTROL
PINCH SOLENOID DRIVER
BRAKE SOLENOID DRIVER
REEL MOTOR CONTROL
THREADING MOTOR DRIVE
PINCH SOLENOID
BRAKE SOLENOID
REEL MOTOR
THREADING MOTOR
SEGMENT DATA
PROGRAM RESET/UP



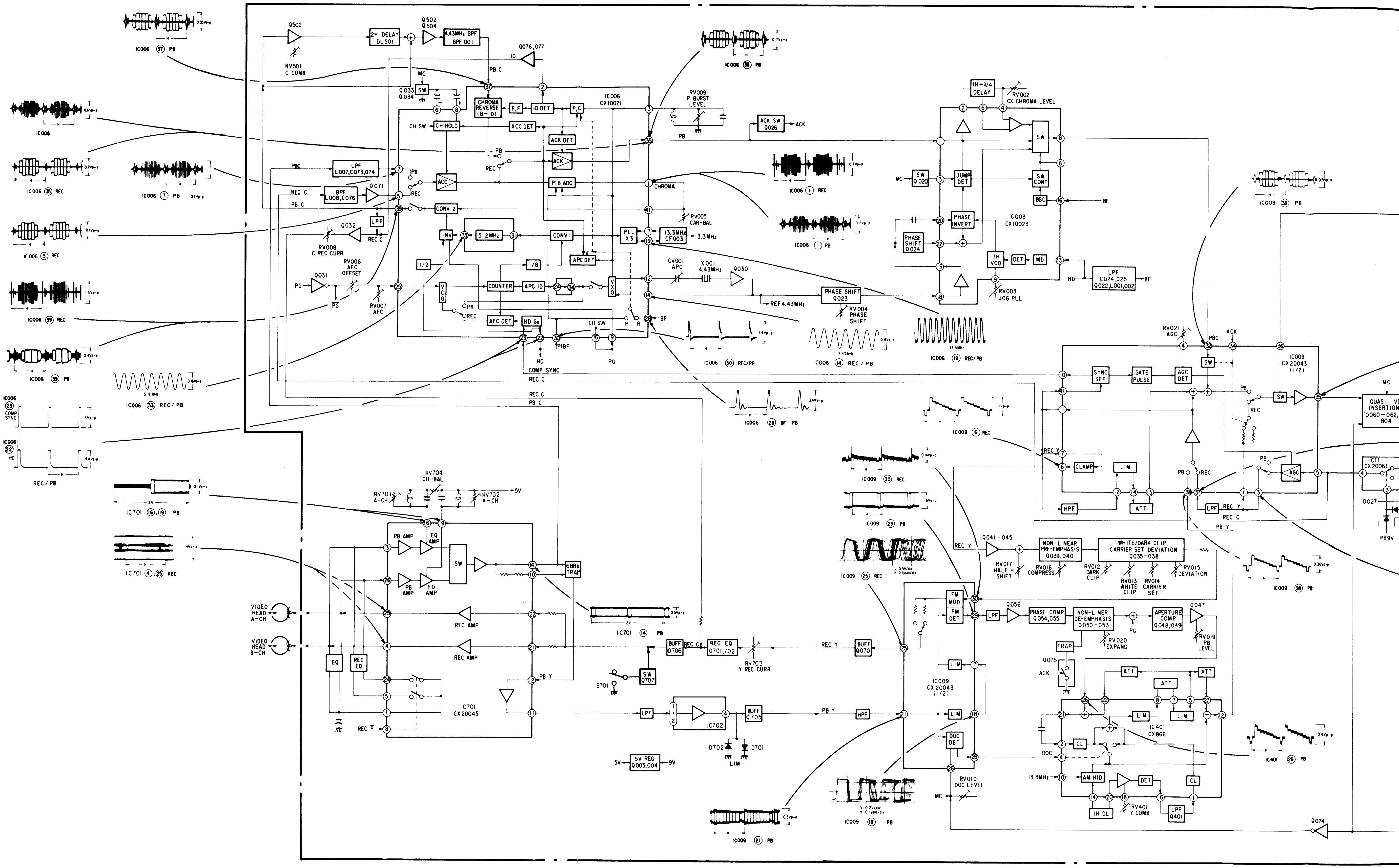
IC001
IC002
REC/PB
AMP
VIDEO
HEAD
A CH,B CH
04(EC MODEL)
C MODEL)
AUDIO
HEAD
a cH, b cH
AUDIO
CIRCUIT
D
SA-9BOARD
REC/PB
AMP
BIAS/ERASE
OSC
IC501
REC/PB
HEAD
AUDIO ERASE
HEAD
FULL ERASE
HEAD
TRACKING
CONTROL
FU-37BOARD
TM-79
BOARD
REC LEVEL
LMU
FU-37
BOARD
HP-14
BOARD
HEAD
PHONE
SA-9
BOARD
RF SW PULSE
IC301
DRUM SERVO
COMP SYNC
4.43MHz
REC CTL
CAPSTAN SERVO
CTL HEAD
IC302
PB CTL
AMP
IC304
LPF
DRIVE
IC306
LPF
DRIVE
IC305
IC307
CAPSTAN
DC BIAS
SELECTOR
IC303
FG
AMP
DRUM
DRUM
MOTOR
M
PG COIL
A,B,S
CAPSTAN MOTOR
M
FG
S END
SENSOR
T END
SENSOR
TAPE END
SENSOR
RD-21
BOARD
TAKE-UP
REEL
FG
SUPPLY
REEL
FG
IC308
REEL FG
AMP
RD-20BOARD
CASSETTE IN
CASSETTE ON
CASSETTE DOWN
THREADING END
UNTHREADING
END
REC PROOF
IC601
SYSTEM CONTROL
SERVO SYSTEM CONTROL
VIDEO SYSTEM CONTROL
AUDIO SYSTEM CONTROL
PINCH SOLENOID
DRIVER
BRAKE SOLENOID
DRIVER
REEL MOTOR
CONTROL
THREADING
MOTOR
DRIVE
PINCH
SOLENOID
BRAKE
SOLENOID
M
REEL
MOTOR
M
THREADING
MOTOR
SEGMENT DATA
PROGRAM RESET/UP
FU-37BOARD
FUNCTION KEY
FUNCTION
INDICATOR
POWER
RS-12BOARD
REMOTE
CONTROL
RECIEVER
IC001
TIMER
· TIMER
· REMOTE
CONTROL
· COUNTER
TIMER SET
KEY
FLUORESCENT
DISPLAY
TM-79,80
BOARD
POWER ON
PS-70,78
BOARD
Q001,004,006
IC001
POWER
SUPPLY
SW 12V
SW 9V
SW 5V
−30V
−10V
AC IN

3-3-1. VIDEO SYSTEM BLOCK DIAGRAM (EC MODEL)

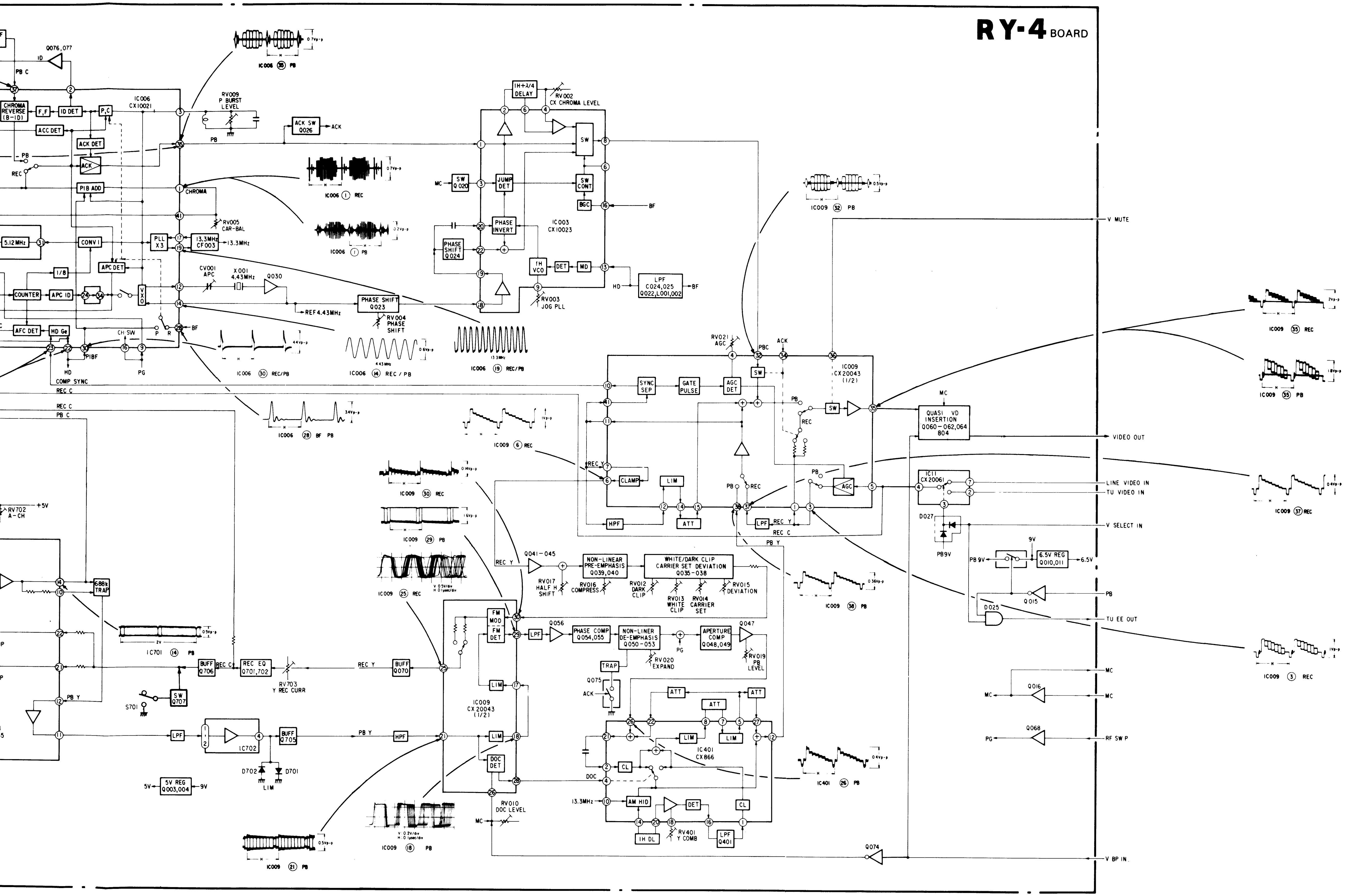

Q502
2H DELAY DL501
4.43MHz BPF BPF 001
SECAM PB C
COUNTER BELL FILTER Q027,028
LV002 COUNTER BELL FILTER
SECAM PB
RV501 C COMB
Q501
PAL
SECAM
MC
Q033 SW 034
CH SW
CHROMA REVERSE (B-ID)
F.F
ID DET
P.C
CH HOLD
ACC DET
ACK DET
ACK
ACC
PIB ADD
CONV 2
CONV 1
INV
5.12MHz
1/2
1/8
VCO
VXO
COUNTER
APC ID
APC DET
AFC DET
HD Ge
PLL X3
13.3MHz CF003
IC006 CX10021
PBC
LPF L007,C073,074
REC C
BPF L008,C076
Q071
PB C
Q032
LPF
RV008 C REC CURR
RV006 AFC OFFSET
Q031
PG
RV007 AFC
RV009 P BURST LEVEL
PAL PB
SECAM REC C
BELL FILTER Q029
LV003 BELL FILTER
PAL REC/PB C
SECAM PB C
RV005 CAR-BAL
CV001 APC
X001 4.43MHz
Q030
REF 4.43MHz
PHASE SHIFT Q023
RV004 PHASE SHIFT
CH SW
COMP SYNC
HD
PIBF
REC C
PB C
D007
ACK
SECAM
PB 9V
Q025
Q026
PAL ACK
IC004 CX894
IC005 CX20061
SECAM REC
D013
PB9V PAL
1H+1/4 DELAY
RV002 CX CHROMA LEVEL
SW
JUMP DET
SW CONT
BGC
PHASE INVERT
PHASE SHIFT Q024
IC003 CX10023
1H VCO
DET
MD
RV003 JOG PLL
SW Q020
SW Q019
IC001 BA634
FF
BF
D006
SW Q021
LPF C024,025 Q022,L001,002
SECAM MODE DISCRIMINATOR IC002 BA7007
RV001 SECAM ACK
CF001 4.16MHz
LV001 SECAM ACK FRQ
SECAM REC
RV021 AGC
SYNC SEP
GATE PULSE
AGC DET
IC009 CX20043 (1/2)
CLAMP
LIM
ATT
HPF
LPF
AGC
Q041-045
NON-LINEAR PRE-EMPHASIS Q039,040
WHITE/DARK CLIP CARRIER SET DEVIATION Q035-038
RV017 HALF H SHIFT
RV016 COMPRESS
RV012 DARK CLIP
RV013 WHITE CLIP
RV014 CARRIER SET
RV015 DEVIATION
REC Y
FM MOD
FM DET
Q056
PHASE COMP Q054,055
NON-LINER DE-EMPHASIS Q050-053
RV020 EXPAND
APERTURE COMP Q048,049
Q047
RV019 PB LEVEL
TRAP
Q075
ACK
DOC DET
RV010 DOC LEVEL
IC401 CX866
AM HID
1H DL
RV401 Y COMB
LPF Q401
CL
DOC
13.3MHz
Q074
RV704 CH-BAL
RV701 A-CH
RV702 A-CH
+5V
PB AMP
EQ AMP
SW
688k TRAP
VIDEO HEAD A-CH
VIDEO HEAD B-CH
REC AMP
EQ
REC EQ
IC701 CX20045
REC P
PB Y
S701
SW Q707
BUFF Q706
REC EQ Q701,702
RV703 Y REC CURR
BUFF Q070
LPF
IC702
BUFF Q705
HPF
D702
D701
LIM
5V REG Q003,004
5V
9V
IC006 ㊲ PB
IC006 ㊱ PB
IC006 ㉟ REC
IC006 ① PB
IC006 ① REC
IC006 ⑦ PB
IC006 ⑤ REC
IC006 ㊴ REC
IC006 ㊴ PB
IC006 ㉝ REC/PB
IC006 ㉓ COMP SYNC
IC006 ㉒ HD
REC/PB
IC006 ㉚ REC/PB
IC701 ⑯,⑲ PB
IC701 ④,㉕ REC
IC701 ⑭ PB
IC006 ⑭ REC/PB
IC006 ㉘ BF PB
IC006 ⑲ REC/PB
IC004 ⑧ PB
IC004 ⑧ REC
IC002 ⑦ REC/PB
IC002 ⑨ REC/PB
IC009 ⑥ REC
IC009 ㉚ REC
IC009 ㉙ PB
IC009 ㉕ REC
IC009 ⑱ PB
IC009 ㉑ PB
IC401 ㉖ PB


RY-4 BOARD
Q502 504
4.43MHz BPF BPF 001
SECAM PB C
COUNTER BELL FILTER Q027,028
LV002 COUNTER BELL FILTER
SECAM PB
PAL PB C
CHROMA REVERSE (B-ID)
F.F
ID DET
P.C
CH HOLD
ACC DET
ACK DET
ACK
ACC
PIB ADD
CONV 2
INV
5.12MHz
CONV 1
PLL X3
13.3MHz CF003
APC DET
1/8
1/2
VCO
COUNTER
APC ID
AFC DET
HD Ge
IC006 CX10021
RV009 P BURST LEVEL
PAL PB
SECAM REC C
BELL FILTER Q029
LV003 BELL FILTER
PAL REC/PB C SECAM PB C
IC005 CX20061
SECAM REC
RV005 CAR-BAL
D013
PB9V
CV001 APC
X001 4.43MHz
Q030
REF 4.43MHz
PHASE SHIFT Q023
RV004 PHASE SHIFT
D007
ACK
Q025
Q026
PAL ACK
IC004 CX894
1H+λ/4 DELAY
RV002 CX CHROMA LEVEL
SW
JUMP DET
PHASE INVERT
PHASE SHIFT Q024
FM VCO
DET
MD
RV003 JOG PLL
IC003 CX10023
SW CONT
BGC
SW Q019
SW Q020
IC001 BA634
D006
SW Q021
LPF C024,025 Q022,L001,002
SECAM MODE DISCRIMINATOR IC002 BA7007
RV001 SECAM ACK
CF001 4.16MHz
LV001 SECAM ACK FRQ
V MUTE
RV021 AGC
SYNC SEP
GATE PULSE
AGC DET
IC009 CX20043 (1/2)
QUASI VD INSERTION Q060-062,064 804
VIDEO OUT
CLAMP
LIM
HPF
ATT
LPF
AGC
IC11 CX20061
LINE VIDEO IN
TU VIDEO IN
D027
V SELECT IN
6.5V REG Q010,011
PB9V
Q015
D025
TU EE OUT
Q041-045
NON-LINEAR PRE-EMPHASIS Q039,040
WHITE/DARK CLIP CARRIER SET DEVIATION Q035-038
RV017 HALF H SHIFT
RV016 COMPRESS
RV012 DARK CLIP
RV013 WHITE CLIP
RV014 CARRIER SET
RV015 DEVIATION
FM MOD
FM DET
Q056
PHASE COMP Q054,055
NON-LINER DE-EMPHASIS Q050-053
APERTURE COMP Q048,049
Q047
RV019 PB LEVEL
RV020 EXPAND
TRAP
Q075
DOC DET
RV010 DOC LEVEL
IC401 CX866
AM HID
CL
1H DL
RV401 Y COMB
LPF Q401
13.3MHz
Q016
Q068
RF SW P
Q074
V BP IN
RV704 CH-BAL
RV702 A-CH
+5V
EQ AMP
REC AMP
686k TRAP
S701
SW Q707
BUFF Q706
REC EQ Q701,702
RV703 Y REC CURR
BUFF Q070
IC701 CX20045
IC702
BUFF Q705
D702
D701
LIM
5V REG Q003,004
IC009 (32) PB
IC009 (35) PB
IC009 (35) REC
IC009 (37) REC
IC009 (3) REC
IC009 (38) PB
IC009 (6) REC
IC009 (30) REC
IC009 (29) PB
IC009 (25) REC
IC009 (21) PB
IC006 (14) REC/PB
IC006 (28) BF PB
IC006 (19) REC/PB
IC004 (8) PB
IC004 (8) REC
IC002 (7) REC/PB
IC002 (9) REC/PB
IC701 (14) PB
IC401 (26) PB

3-3-2. VIDEO SYSTEM BLOCK DIAGRAM (AS MODEL)

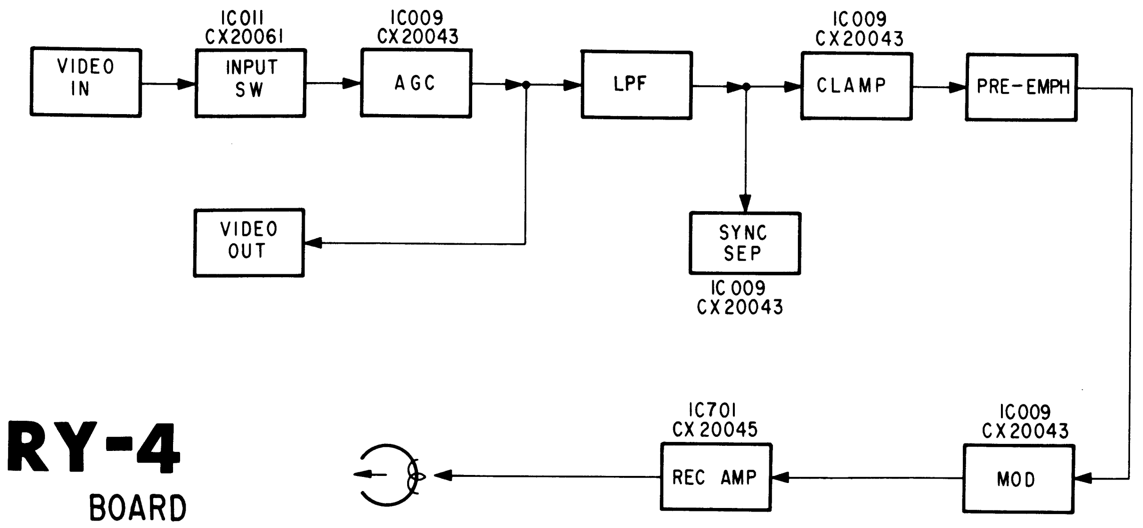


IC006 ㊲ PB
IC006 ㉟ REC
IC006 ⑦ PB
IC006 ⑤ REC
IC006 ㊴ REC
IC006 ㊴ PB
IC006 ㉝ REC/PB
IC006 ㉓ COMP SYNC
IC006 ㉒ HD
REC/PB
IC701 ⑯,⑲ PB
IC701 ④,㉕ REC
Q502
RV501 C COMB
2H DELAY DL501
Q502 Q504
4.43MHz BPF BPF 001
Q076,077
ID
PB C
MC
Q033 Q034
SW
CHROMA REVERSE (B-ID)
F.F
ID DET
P.C
ACC DET
ACK DET
ACK
CH SW
CH HOLD
ACC
PIB ADD
PBC
LPF L007,C073,074
REC C
BPF L008,C076
Q071
PB C
CONV 2
LPF
Q032
RV008 C REC CURR
RV006 AFC OFFSET
Q031
PG
RV007 AFC
INV
5.12MHz
CONV 1
1/2
1/8
VCO
COUNTER
APC ID
APC DET
AFC DET
HD Ge
CH SW
PIBF
HD
COMP SYNC
REC C
PB C
IC006 CX10021
RV009 P BURST LEVEL
ACK SW Q026
CHROMA
RV005 CAR-BAL
PLL X3
13.3MHz CF003
13.3MHz
CV001 APC
X001 4.43MHz
Q030
REF 4.43MHz
VXO
PHASE SHIFT Q023
RV004 PHASE SHIFT
BF
IC006 ① REC
IC006 ① PB
IC006 ㉚ REC/PB
IC006 ⑭ REC/PB
IC006 ⑲ REC/PB
IC006 ㉘ BF PB
IH+λ/4 DELAY
RV002 CX CHROMA LEVEL
SW
SW Q020
JUMP DET
SW CONT
BGC
PHASE SHIFT Q024
PHASE INVERT
IC003 CX10023
IH VCO
DET
MD
RV003 JOG PLL
LPF C024,025 Q022,L001,002
IC009 ㉜ PB
RV021 AGC
ACK
IC009 CX20043 (1/2)
SYNC SEP
GATE PULSE
AGC DET
REC Y
CLAMP
LIM
HPF
ATT
AGC
LPF
PB Y
QUASI V INSERTION Q060-062, 804
IC11 CX20061
D027
PB9V
IC009 ⑥ REC
IC009 ㉚ REC
IC009 ㉙ PB
IC009 ㉕ REC
IC009 ㊳ PB
Q041-045
NON-LINEAR PRE-EMPHASIS Q039,040
WHITE/DARK CLIP CARRIER SET DEVIATION Q035-038
RV017 HALF H SHIFT
RV016 COMPRESS
RV012 DARK CLIP
RV013 WHITE CLIP
RV014 CARRIER SET
RV015 DEVIATION
FM MOD
FM DET
Q056
PHASE COMP Q054,055
NON-LINER DE-EMPHASIS Q050-053
RV020 EXPAND
APERTURE COMP Q048,049
Q047
RV019 PB LEVEL
TRAP
Q075
IC009 CX20043 (1/2)
DOC DET
RV010 DOC LEVEL
IC401 CX866
AM HID
IH DL
RV401 Y COMB
LPF Q401
CL
DOC
13.3MHz
Q074
IC401 ㉖ PB
IC009 ⑱ PB
IC009 ㉑ PB
RV704 CH-BAL
RV701 A-CH
RV702 A-CH
+5V
PB AMP
EQ AMP
688k TRAP
VIDEO HEAD A-CH
VIDEO HEAD B-CH
REC AMP
EQ
REC EQ
REC P
IC701 CX20045
PB Y
IC701 ⑭ PB
BUFF Q706
REC EQ Q701,702
RV703 Y REC CURR
BUFF Q070
S701
SW Q707
IC702
BUFF Q705
D702
D701
LIM
5V REG Q003,004
5V
9V

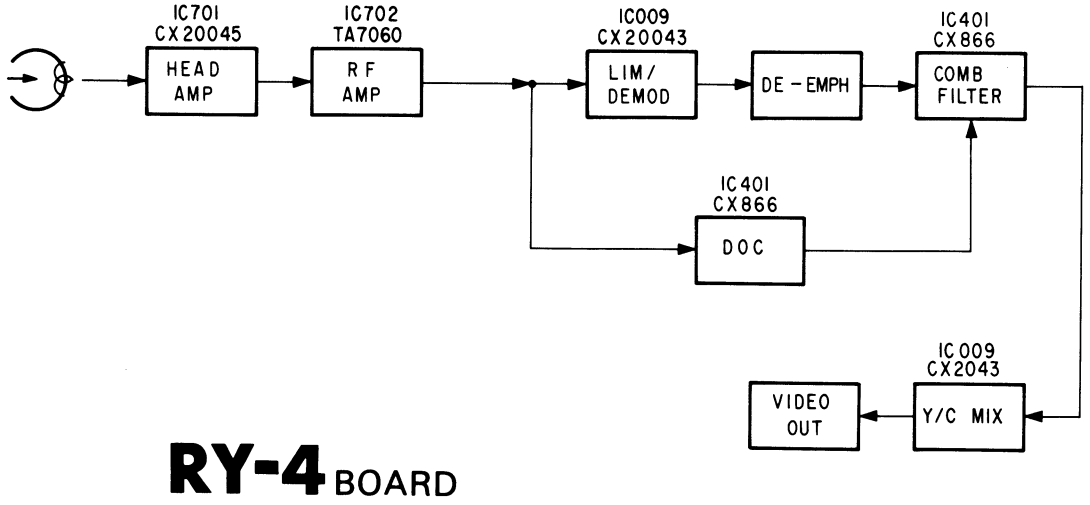

RY-4 BOARD
Q076,077
ID
PB C
CHROMA REVERSE (B-ID)
F,F
ID DET
P,C
IC006 CX10021
ACC DET
ACK DET
ACK
P1B ADD
5.12MHz
CONV I
PLL X3
13.3MHz CF003
13.3MHz
1/8
APC DET
COUNTER
APC ID
VXO
AFC DET
HD Ge
CH SW
HD
PG
P1BF
COMP SYNC
REC C
PB C
RV009 P BURST LEVEL
RV005 CAR-BAL
CV001 APC
X001 4.43MHz
Q030
REF 4.43MHz
PHASE SHIFT Q023
RV004 PHASE SHIFT
CHROMA
BF
ACK SW Q026
ACK
IC006 ㊳ PB
IC006 ① REC
IC006 ① PB
IC006 ㉚ REC/PB
IC006 ⑭ REC / PB
IC006 ⑲ REC/PB
IC006 ㉘ BF PB
1H+λ/4 DELAY
RV002 CX CHROMA LEVEL
SW
SW CONT
BGC
SW Q020
JUMP DET
PHASE INVERT
PHASE SHIFT Q024
IC003 CX10023
fH VCO
DET
MD
RV003 JOG PLL
LPF C024,025 Q022,L001,002
IC009 ㉜ PB
V MUTE
RV021 AGC
PBC
ACK
IC009 CX20043 (1/2)
SYNC SEP
GATE PULSE
AGC DET
SW
CLAMP
LIM
ATT
HPF
LPF
REC C
PB Y
REC Y
MC
QUASI VD INSERTION Q060-062,064 804
VIDEO OUT
IC11 CX20061
AGC
LINE VIDEO IN
TU VIDEO IN
D027
V SELECT IN
PB9V
9V
6.5V REG Q010,011
6.5V
Q015
D025
TU EE OUT
Q016
Q068
RF SW P
Q074
V BP IN
IC009 ⑥ REC
IC009 ㉚ REC
IC009 ㉙ PB
IC009 ㉕ REC
IC009 ⑱ PB
IC009 ㉑ PB
IC009 ㊳ PB
IC401 ㉖ PB
IC009 ㉟ REC
IC009 ㉟ PB
IC009 ㊲ REC
IC009 ③ REC
Q041-045
NON-LINEAR PRE-EMPHASIS Q039,040
WHITE/DARK CLIP CARRIER SET DEVIATION Q035-038
RV017 HALF H SHIFT
RV016 COMPRESS
RV012 DARK CLIP
RV013 WHITE CLIP
RV014 CARRIER SET
RV015 DEVIATION
FM MOD
FM DET
Q056
PHASE COMP Q054,055
NON-LINER DE-EMPHASIS Q050-053
APERTURE COMP Q048,049
Q047
RV019 PB LEVEL
RV020 EXPAND
TRAP
Q075
IC009 CX20043 (1/2)
DOC DET
RV010 DOC LEVEL
DOC
13.3MHz
AM HID
1H DL
RV401 Y COMB
LPF Q401
IC401 CX866
CL
RV702 A-CH
+5V
688k TRAP
IC701 ⑭ PB
BUFF Q706
REC EQ Q701,702
RV703 Y REC CURR
BUFF Q070
SW Q707
S701
IC702
BUFF Q705
D702
D701
LIM
5V REG Q003,004
5V
9V
PB Y

3-4. VIDEO Y BLOCK DIAGRAM

REC Y

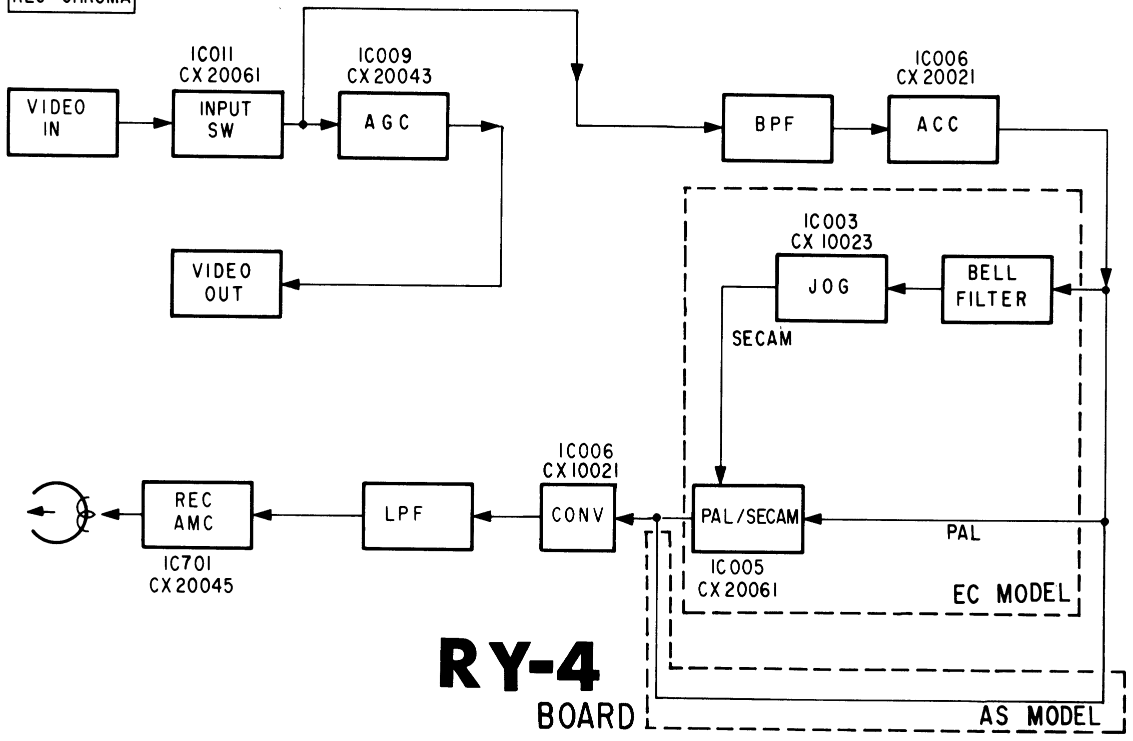

IC011
CX20061
IC009
CX20043
VIDEO IN
INPUT SW
AGC
LPF
IC009
CX20043
CLAMP
PRE-EMPH
VIDEO OUT
SYNC SEP
IC009
CX20043
RY-4
BOARD
IC701
CX20045
REC AMP
IC009
CX20043
MOD

PB Y

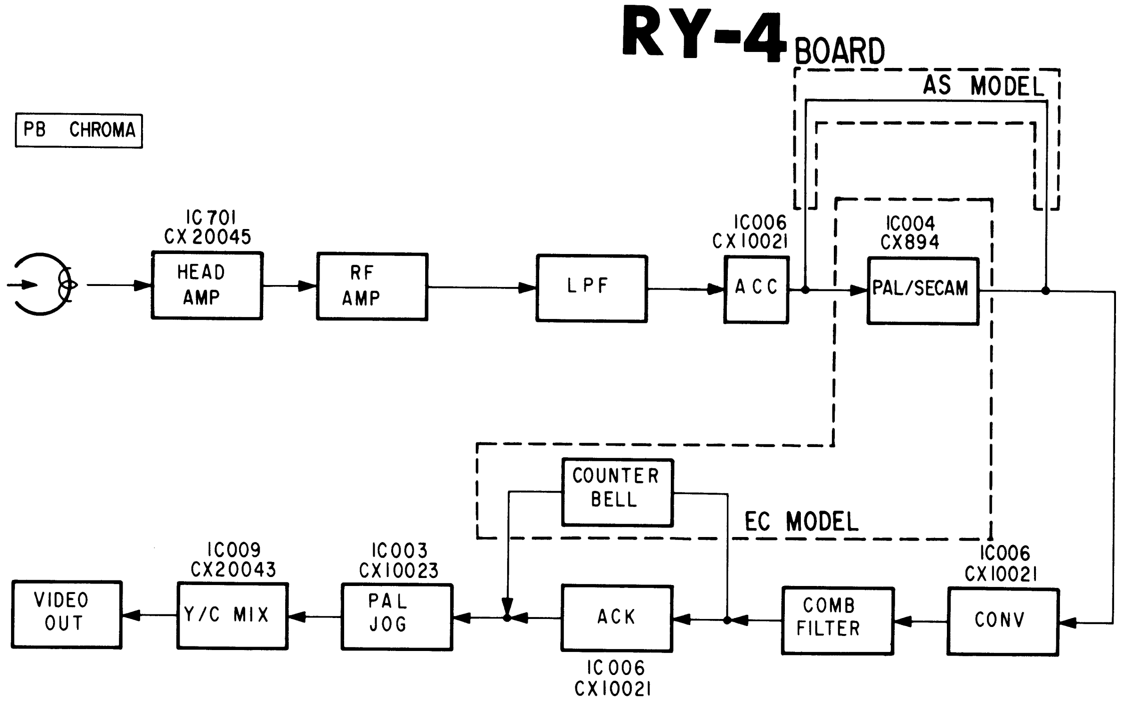

IC701
CX20045
HEAD AMP
IC702
TA7060
RF AMP
IC009
CX20043
LIM/ DEMOD
DE-EMPH
IC401
CX866
COMB FILTER
IC401
CX866
DOC
IC009
CX2043
VIDEO OUT
Y/C MIX
RY-4 BOARD

3-5. VIDEO CHROMA BLOCK DIAGRAM

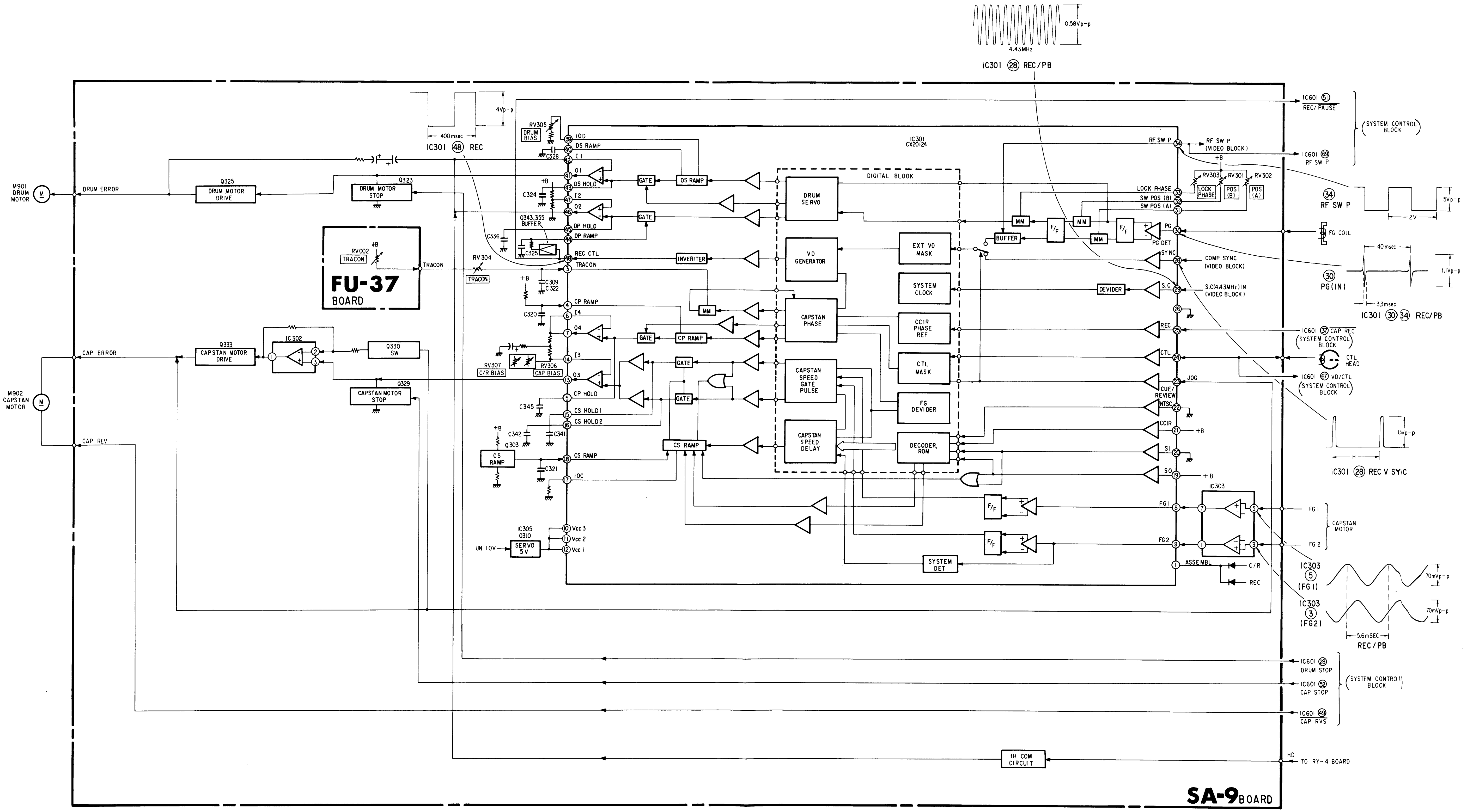
REC CHROMA


IC011
CX20061
IC009
CX20043
IC006
CX20021
VIDEO IN
INPUT SW
AGC
BPF
ACC
IC003
CX10023
JOG
BELL FILTER
VIDEO OUT
SECAM
IC006
CX10021
REC AMC
LPF
CONV
PAL/SECAM
PAL
IC701
CX20045
IC005
CX20061
EC MODEL
RY-4
BOARD
AS MODEL

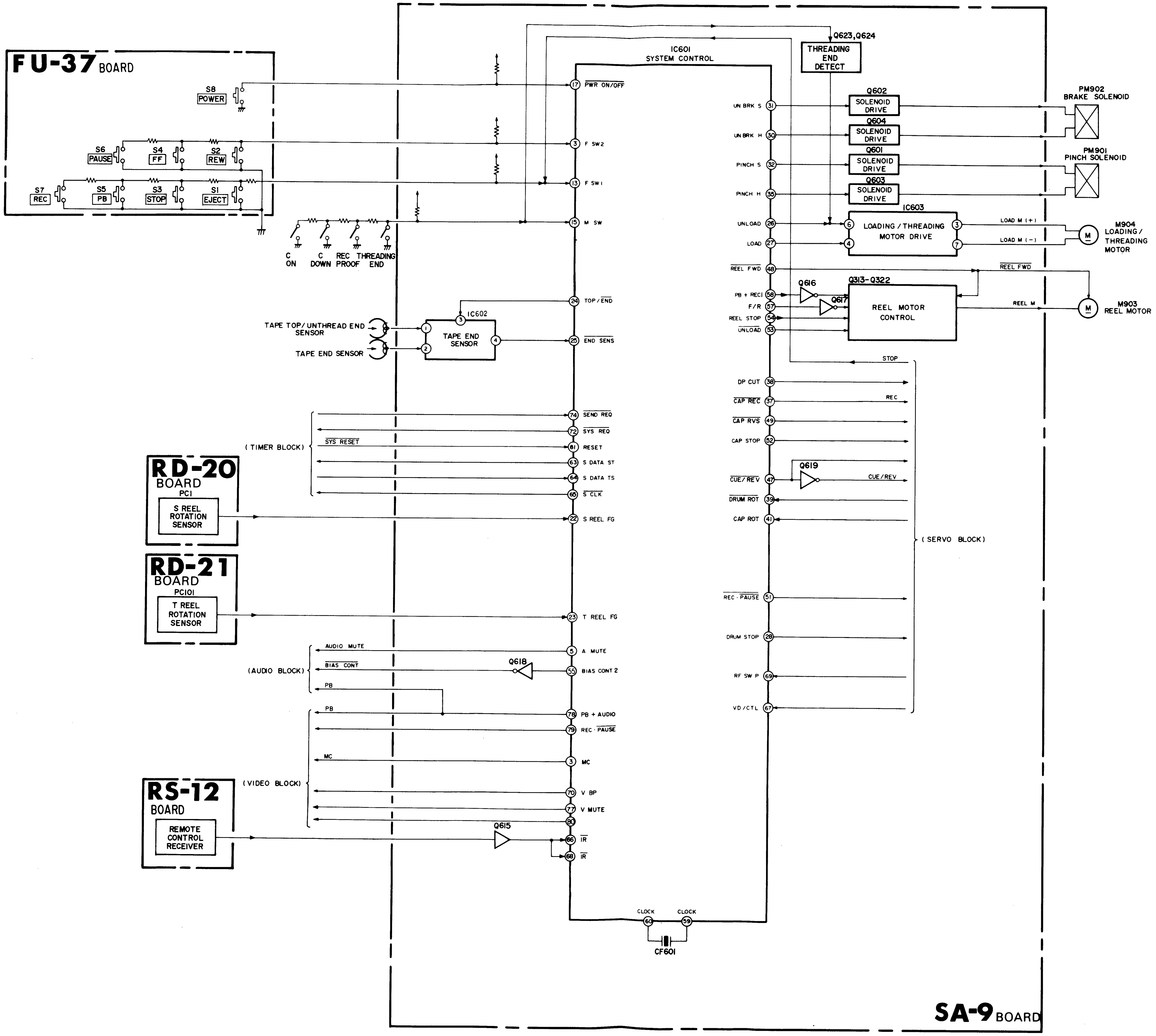
PB CHROMA


RY-4 BOARD
AS MODEL
IC701
CX20045
IC006
CX10021
IC004
CX894
HEAD AMP
RF AMP
LPF
ACC
PAL/SECAM
COUNTER BELL
EC MODEL
IC009
CX20043
IC003
CX10023
IC006
CX10021
VIDEO OUT
Y/C MIX
PAL JOG
ACK
COMB FILTER
CONV
IC006
CX10021

3-6. SERVO SYSTEM BLOCK DIAGRAM


0.58Vp-p
4.43MHz
IC301 ㉘ REC/PB
4Vp-p
400msec
IC301 ㊽ REC
M901 DRUM MOTOR
DRUM ERROR
Q325 DRUM MOTOR DRIVE
Q323 DRUM MOTOR STOP
RV305 DRUM BIAS
C328
C324
Q343,355 BUFFER
C336
C325
FU-37 BOARD
RV002 TRACON
TRACON
RV304 TRACON
C309
C322
C320
RV307 C/R BIAS
RV306 CAP BIAS
C345
C342
Q303
C341
CS RAMP
C321
IC305 Q310
UN 10V
SERVO 5V
Vcc 3
Vcc 2
Vcc 1
IOD
DS RAMP
I1
O1
DS HOLD
I2
O2
DP HOLD
DP RAMP
REC CTL
TRACON
CP RAMP
I4
O4
I3
O3
CP HOLD
CS HOLD1
CS HOLD2
CS RAMP
IOC
GATE
DS RAMP
INVERITER
MM
CP RAMP
CS RAMP
IC301 CX20124
DIGITAL BLOOK
DRUM SERVO
VD GENERATOR
CAPSTAN PHASE
CAPSTAN SPEED GATE PULSE
CAPSTAN SPEED DELAY
EXT VD MASK
SYSTEM CLOCK
CCIR PHASE REF
CTL MASK
FG DEVIDER
DECODER, ROM
SYSTEM DET
F/F
BUFFER
DEVIDER
PG DET
RF SW P
LOCK PHASE
SW POS (B)
SW POS (A)
PG
SYNC
S.C
REC
CTL
JOG
CUE/REVIEW
NTSC
CCIR
S1
S0
FG1
FG2
ASSEMBL
C/R
REC
IC303
RV303 LOCK PHASE
RV301 POS (B)
RV302 POS (A)
M902 CAPSTAN MOTOR
CAP ERROR
CAP REV
Q333 CAPSTAN MOTOR DRIVE
IC302
Q330 SW
Q329 CAPSTAN MOTOR STOP
1H COM CIRCUIT
SA-9 BOARD
IC601 ⑤ REC/PAUSE
(SYSTEM CONTROL BLOCK)
RF SW P (VIDEO BLOCK)
IC601 ㊾ RF SW P
㉞ RF SW P
5Vp-p
2V
FG COIL
COMP SYNC (VIDEO BLOCK)
S.C(4.43MHz)IN (VIDEO BLOCK)
40msec
1.1Vp-p
㉚ PG(IN)
3.3msec
IC301 ㉚㉞ REC/PB
IC601 ㊲ CAP REC (SYSTEM CONTROL BLOCK)
CTL HEAD
IC601 ㊼ VD/CTL (SYSTEM CONTROL BLOCK)
1.5Vp-p
H
IC301 ㉘ REC V SYIC
FG1
FG2
CAPSTAN MOTOR
IC303 ⑤ (FG1)
IC303 ③ (FG2)
70mVp-p
70mVp-p
5.6mSEC
REC/PB
IC601 ㉘ DRUM STOP
IC601 ㊿ CAP STOP
IC601 ㊾ CAP RVS
(SYSTEM CONTROL BLOCK)
HD
TO RY-4 BOARD

3-7. SYSTEM CONTROL BLOCK DIAGRAM


FU-37 BOARD
S8 POWER
S6 PAUSE
S4 FF
S2 REW
S7 REC
S5 PB
S3 STOP
S1 EJECT
C ON
C DOWN
REC PROOF
THREADING END
TAPE TOP/UNTHREAD END SENSOR
TAPE END SENSOR
IC602
TAPE END SENSOR
RD-20 BOARD
PC1
S REEL ROTATION SENSOR
RD-21 BOARD
PC101
T REEL ROTATION SENSOR
RS-12 BOARD
REMOTE CONTROL RECEIVER
(TIMER BLOCK)
SYS RESET
(AUDIO BLOCK)
AUDIO MUTE
BIAS CONT
PB
(VIDEO BLOCK)
PB
MC
Q618
Q615
IC601
SYSTEM CONTROL
PWR ON/OFF
F SW2
F SW1
M SW
TOP/END
END SENS
SEND REQ
SYS REQ
RESET
S DATA ST
S DATA TS
S CLK
S REEL FG
T REEL FG
A MUTE
BIAS CONT 2
PB + AUDIO
REC · PAUSE
MC
V BP
V MUTE
IR
IR
CLOCK
CLOCK
CF601
Q623,Q624
THREADING END DETECT
UN BRK S
UN BRK H
PINCH S
PINCH H
UNLOAD
LOAD
REEL FWD
PB + REC1
F/R
REEL STOP
UNLOAD
Q602
SOLENOID DRIVE
Q604
SOLENOID DRIVE
Q601
SOLENOID DRIVE
Q603
SOLENOID DRIVE
IC603
LOADING / THREADING MOTOR DRIVE
LOAD M (+)
LOAD M (−)
REEL FWD
Q616
Q617
Q313-Q322
REEL MOTOR CONTROL
REEL M
PM902
BRAKE SOLENOID
PM901
PINCH SOLENOID
M904
LOADING/THREADING MOTOR
M903
REEL MOTOR
STOP
DP CUT
CAP REC
REC
CAP RVS
CAP STOP
Q619
CUE/REV
CUE/REV
DRUM ROT
CAP ROT
(SERVO BLOCK)
REC · PAUSE
DRUM STOP
RF SW P
VD/CTL
SA-9 BOARD

3-8. SYSTEM CONTROL CIRCUIT AND MECHANISM BLOCK INTERFACE

SIGNAL	I/O	IC601 Pin No.	EJECTED	LOADING	THREADING	STOP	UN-THREADING	UN-LOADING	FF	REW	PB	PB PAUSE	PICTURE SEARCH		REC	REC PAUSE	FR SEARCH	
													CUE	REV			CUE	REV
M SW *1	I	⑮	5V	3V	1V (2V)	0V	1V (2V)	3V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V
TOP/$\overline{\text{END}}$	O	㉔	L	L	L	L	H	H	L	H	L	L	L	H	L	L	L	H
$\overline{\text{END SENS}}$	I	㉕	H	H/L	H/L	H	H	L	H	H	H	H	H	H	H	H	H	H
UNLOAD	O	㉖	L	L	L	L	H	H	L	L	L	L	L	L	L	L	L	L
LOAD	O	㉗	L	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
UNBRK (H)	O	㉚	L	L	L	L	L	L	H	H	H	L	H	H	H	L	H	H
UNBRK (S)	O	㉛	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
PINCH (S)	O	㉜	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
PINCH (H)	O	㉟	L	H	L	L	L	H	L	L	H	L	H	H	H	L	L	L

*1 (   ) : THE SAFTY TAB OF THE CASSETTE IS BROKEN

3-9. SYSTEM CONTROL CIRCUIT AND TIMER CIRCUIT INTERFACE

SIGNAL	I/O	IC601 Pin No.	MODE
			USUAL
S DATA ST	O	(63)	L
S DATA TS	I	(64)	L
$\overline{\text{S CLK}}$	I	(65)	H
$\overline{\text{SYS REQ}}$	O	(72)	H
$\overline{\text{SEND REQ}}$	I	(74)	H

3-10. SYSTEM CONTROL CIRCUIT AND ITS PERIPHERAL CIRCUIT INTE

SIGNAL	I/O	IC601 Pin No.	MODE					
			USUAL	PRESSED BUT				
				EJECT	STOP	PB	REC	
F SW 1	I	⑬	5V	0V	1V	2V	3V	
F SW 2	I	⑭	5V	–	–	–	–	
V HOLD *1	I	⑯	0V – 5V *2	–	–	–	–	
$\overline{\text{POWER ON}}$/OFF	I	⑰	5V	–	–	–	–	
$\overline{\text{IR}}$	I	(66) , (68)	5V	–	–	–	–	

*1 : NOT USED
*2 : BY V HOLD VR

PICTURE SEARCH		REC	REC PAUSE	FR SEARCH	
UE	REV			CUE	REV
V	0V	0V	0V	0V	0V
	H	L	L	L	H
I	H	H	H	H	H
	L	L	L	L	L
	L	L	L	L	L
I	H	H	L	H	H
	L	L	L	L	L
	L	L	L	L	L
I	H	H	L	L	L

3-10. SYSTEM CONTROL CIRCUIT AND ITS PERIPHERAL CIRCUIT INTERFACE

SIGNAL	I/O	IC601 Pin No.	MODE									
			USUAL	PRESSED BUTTON								
				EJECT	STOP	PB	REC		REW	FF	PAUSE	POWER
F SW 1	I	⑬	5V	0V	1V	2V	3V		–	–	–	–
F SW 2	I	⑭	5V	–	–	–	–		0V	1V	2V	–
V HOLD *¹	I	⑯	0V – 5V *²	–	–	–	–		–	–	–	–
$\overline{\text{POWER ON/OFF}}$	I	⑰	5V	–	–	–	–		–	–	–	0V
$\overline{\text{IR}}$	I	(66), (68)	5V	–	–	–	–		–	–	–	–

*¹ : NOT USED
*² : BY V HOLD VR

3-11. SYSTEM CONTROL CIRCUIT AND REEL MOTOR CONTROL CIRCUIT INTERFACE

SIGNAL	I/O	IC601 Pin No.	EJECTED	LOADING	THREADING	STOP	UN-THREADING	UN-LOADING	FF	REW	PB	PB PAUSE	PICTURE SEARCH		REC	REC PAUSE	FR SEARCH	
													CUE	REV			CUE	REV
$\overline{\text{CUE/REV}}$	O	㊼	H	H	H	H	H	H	H	H	H	H	L	L	H	H	H	H
$\overline{\text{REEL FWD}}$	O	㊽	L	L	L	L	H	L	L	H	L	L	L	H	L	L	L	H
REEL STOP	O	(54)	H	H	L	H	L	H	L	L	L	H	L	L	L	H	L	L
F/R	O	(57)	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H
PB + REC 1	O	(58)	L	L	L	L	L	L	L	L	H	H	L	L	H	H	L	L
$\overline{\text{UNLOAD}}$	O	(53)	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H

3-12. SYSTEM CONTROL CIRCUIT AND VIDEO CIRCUIT INTERFACE

SIGNAL	I/O	IC601 Pin No.	STOP	FF	REW	PB	PB PAUSE	PICTURE SERCH		REC OR TIMER REC	REC PAUSE	WAIT PAUSE	FR SEARCH	
								CUE	REV				CUE	REV
PAUSE	O	①	L	L	L	L	H	L	L	L	H	*1	L	L
MC	O	③	L	L	L	L	H	H	H	L	L	L	H	H
VBP	O	(70)	H	H	H	H	H	H	H	H	H	H	H	H
V MUTE	O	(77)	L	L	L	L	L	L	L	L	L	L	L	L
PB + AUDIO DUB	O	(78)	L	L	L	H	H	H	H	L	L	L	H	H
REC · $\overline{\text{P}}$	O	(79)	L	L	L	L	L	L	L	H	L	L	L	L

*1: T = 2(SEC),
50% duty ratio pulse

3-13. SYSTEM CONTROL CIRCUIT AND SERVO CIRCUIT INTERFAC

SIGNAL	I/O	IC601 Pin No.	STOP	FF	REW	PB	PB PAUSE	PICTU SEARC
								CUE
S REEL FG	I	㉒	H/L	FG	FG	FG	H/L	FG
T REEL FG	I	㉓	H/L	FG	FG	FG	H/L	FG
DRUM STOP	O	㉘	H	L	L	L	L	L
REC	O	㊲	L	L	L	L	L	L
DP CUT	O	㊳	L	L	L	L	H	H
DRUM ROT	I	㊴	L	H	H	H	H	H
CAP ROT	I	㊶	L	L	L	H	H	H
PB + REC 2*1	O	㊹	L	L	L	H	H	L
$\overline{\text{CUE/REV}}$	O	㊼	H	H	H	H	H	L
$\overline{\text{CAP RVS}}$	O	㊾	H	H	H	H	H	H
$\overline{\text{REC}\cdot\overline{\text{P}}}$	O	(51)	H	H	H	H	H	H
CAP STOP	O	(52)	H	H	H	L	L	L
VD/CTL	I	(67)	L	PB CTL	PB CTL	PB CTL	L	PB CTL
RF SW P	I	(59)	H/L	RF SWP	RF SWP	RF SWP	RF SWP	RF SWP

*1: NOT USED
*2: T = 2(SEC),
50% duty ratio pulse

3-14. SYSTEM CONTROL CIRCUIT AND AUDIO CIRCUIT INTERFAC

SIGNAL	I/O	IC601 Pin No.	MOD					
			STOP	FF	REW	PB	PB·PAUSE	PICTU SEARC
								CUE
AUDIO DUB *1	O	④	L	L	L	L	L	L
A MUTE	O	⑤	L	L	L	L	H	H
BIAS CONT 2	O	(55)	L	L	L	L	L	L
PB + AUDIO DUB	O	(78)	L	L	L	H	H	H

PICTURE SEARCH		REC	REC PAUSE	FR SEARCH	
CUE	REV			CUE	REV
L	L	H	H	H	H
L	H	L	L	L	H
L	L	L	H	L	L
L	L	L	L	H	H
L	L	H	H	L	L
H	H	H	H	H	H

FR SEARCH	
CUE	REV
L	L
H	H
H	H
L	L
H	H
L	L

3-13. SYSTEM CONTROL CIRCUIT AND SERVO CIRCUIT INTERFACE

SIGNAL	I/O	IC601 Pin No.	STOP	FF	REW	PB	PB PAUSE	PICTURE SEARCH		REC OR TIMER REC	REC PAUSE	WAIT PAUSE	FR SEARCH	
								CUE	REV				CUE	REV
S REEL FG	I	㉒	H/L	FG	FG	FG	H/L	FG	FG	FG	H/L	H/L	FG	FG
T REEL FG	I	㉓	H/L	FG	FG	FG	H/L	FG	FG	FG	H/L	H/L	FG	FG
DRUM STOP	O	㉘	H	L	L	L	L	L	L	L	L	H	L	L
REC .	O	㊲	L	L	L	L	L	L	L	H	H	L	L	L
DP CUT	O	㊳	L	L	L	L	H	H	H	L	L	L	H	H
DRUM ROT	I	㊴	L	H	H	H	H	H	H	H	H	L	H	H
CAP ROT	I	㊶	L	L	L	H	H	H	H	H	H	L	L	L
PB + REC 2*1	O	㊹	L	L	L	H	H	L	L	H	H	L	L	L
$\overline{\text{CUE/REV}}$	O	㊼	H	H	H	H	H	L	L	H	H	H	H	H
$\overline{\text{CAP RVS}}$	O	㊾	H	H	H	H	H	H	L	H	H	H	H	H
$\overline{\text{REC} \cdot \overline{\text{P}}}$	O	(51)	H	H	H	H	H	H	H	L	H	H	H	H
CAP STOP	O	(52)	H	H	H	L	L	L	L	L	L	H	H	H
VD/CTL	I	(67)	L	PB CTL	PB CTL	PB CTL	L	PB CTL	PB CTL	VD	L	L	PB CTL	PB CTL
RF SW P	I	(59)	H/L	RF SWP	RF SWP	RF SWP	RF SWP	RF SWP	RF SWP	RF SWP	RF SWP	H/L	RF SWP	RF SWP

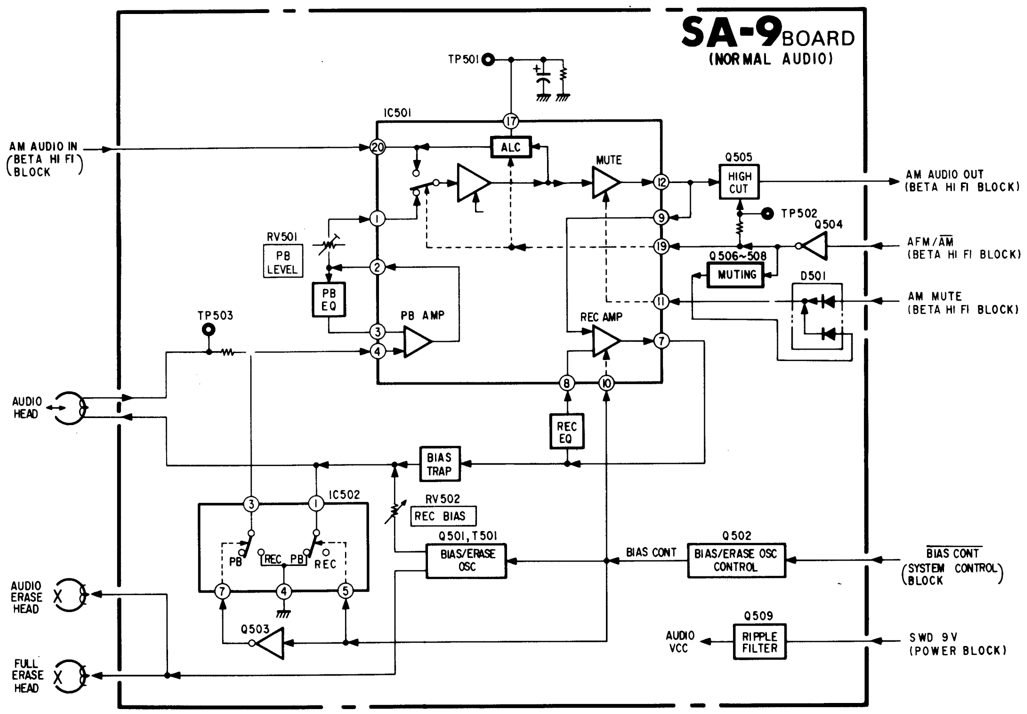
*1: NOT USED
*2: T = 2(SEC),
50% duty ratio pulse

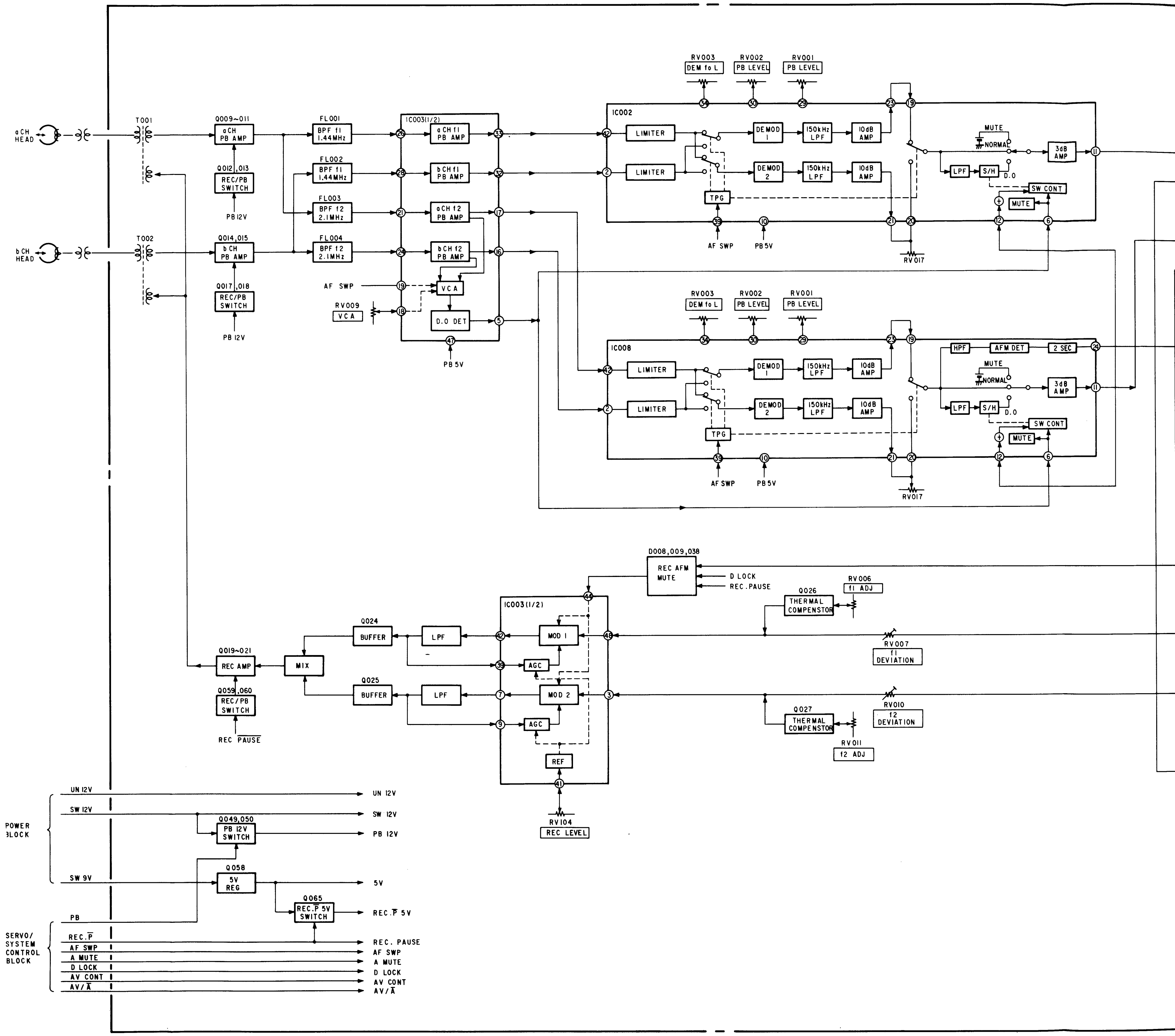
3-14. SYSTEM CONTROL CIRCUIT AND AUDIO CIRCUIT INTERFACE

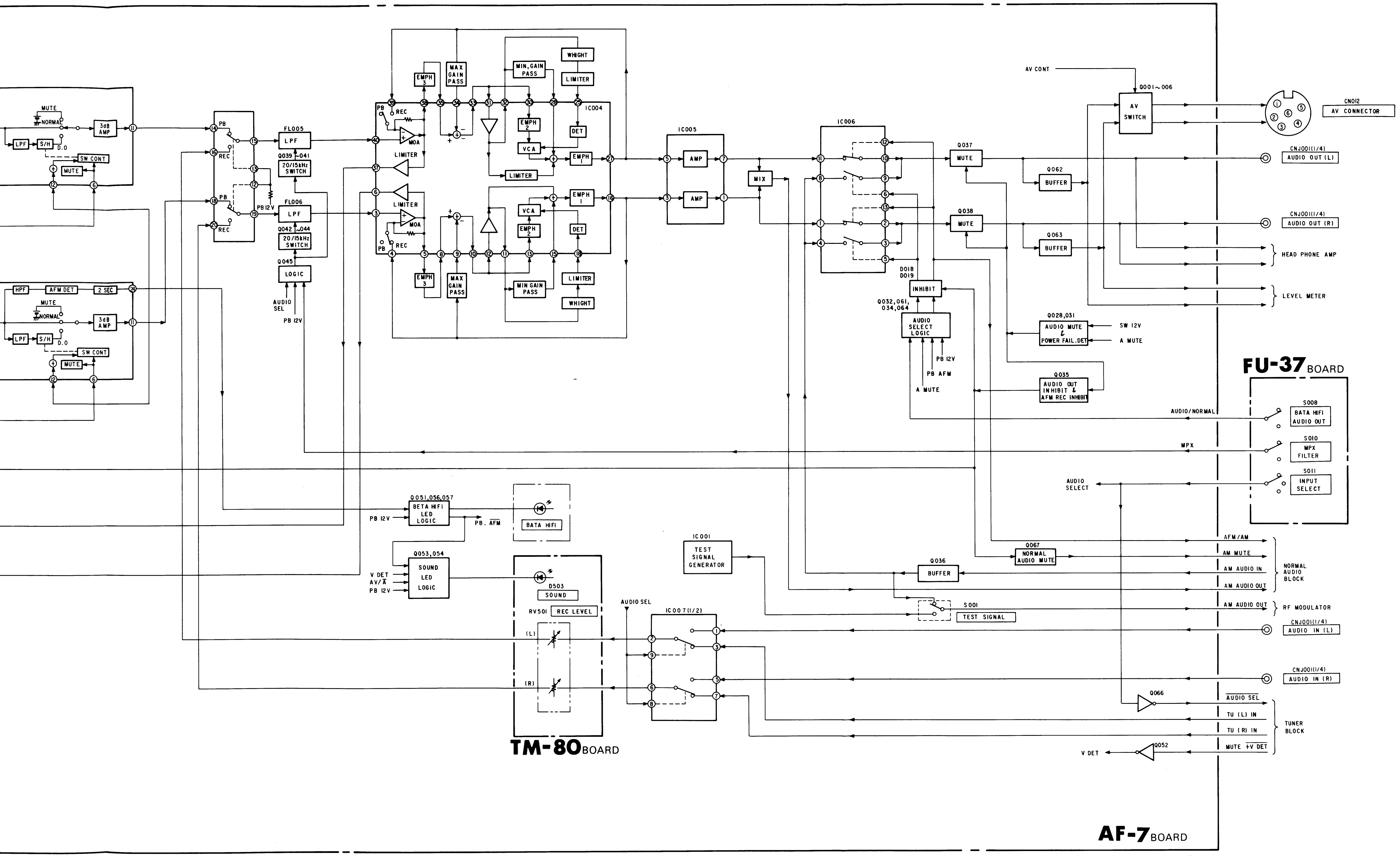
SIGNAL	I/O	IC601 Pin No.	MODE											
			STOP	FF	REW	PB	PB· PAUSE	PICTURE SEARCH		REC OR TIMER REC	REC· PAUSE	WAIT PAUSE	FR SEARCH	
								CUE	REV				CUE	REV
AUDIO DUB *1	O	④	L	L	L	L	L	L	L	L	L	L	L	L
A MUTE	O	⑤	L	L	L	L	H	H	H	L	L	L	H	H
BIAS CONT 2	O	(55)	L	L	L	L	L	L	L	H	L	L	L	L
PB + AUDIO DUB	O	(78)	L	L	L	H	H	H	H	L	L	L	H	H

*1 NOT USED

3-15. AUDIO BLOCK DIAGRAM


SA-9 BOARD
(NORMAL AUDIO)
TP501
IC501
ALC
MUTE
Q505
HIGH CUT
TP502
Q504
Q506~508
MUTING
D501
RV501
PB LEVEL
PB EQ
PB AMP
REC AMP
TP503
REC EQ
BIAS TRAP
IC502
PB
REC
RV502
REC BIAS
Q501, T501
BIAS/ERASE OSC
BIAS CONT
Q502
BIAS/ERASE OSC CONTROL
Q503
Q509
RIPPLE FILTER
AUDIO VCC
AM AUDIO IN (BETA HI FI BLOCK)
AM AUDIO OUT (BETA HI FI BLOCK)
AFM/AM (BETA HI FI BLOCK)
AM MUTE (BETA HI FI BLOCK)
BIAS CONT (SYSTEM CONTROL BLOCK)
SWD 9V (POWER BLOCK)
AUDIO HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD

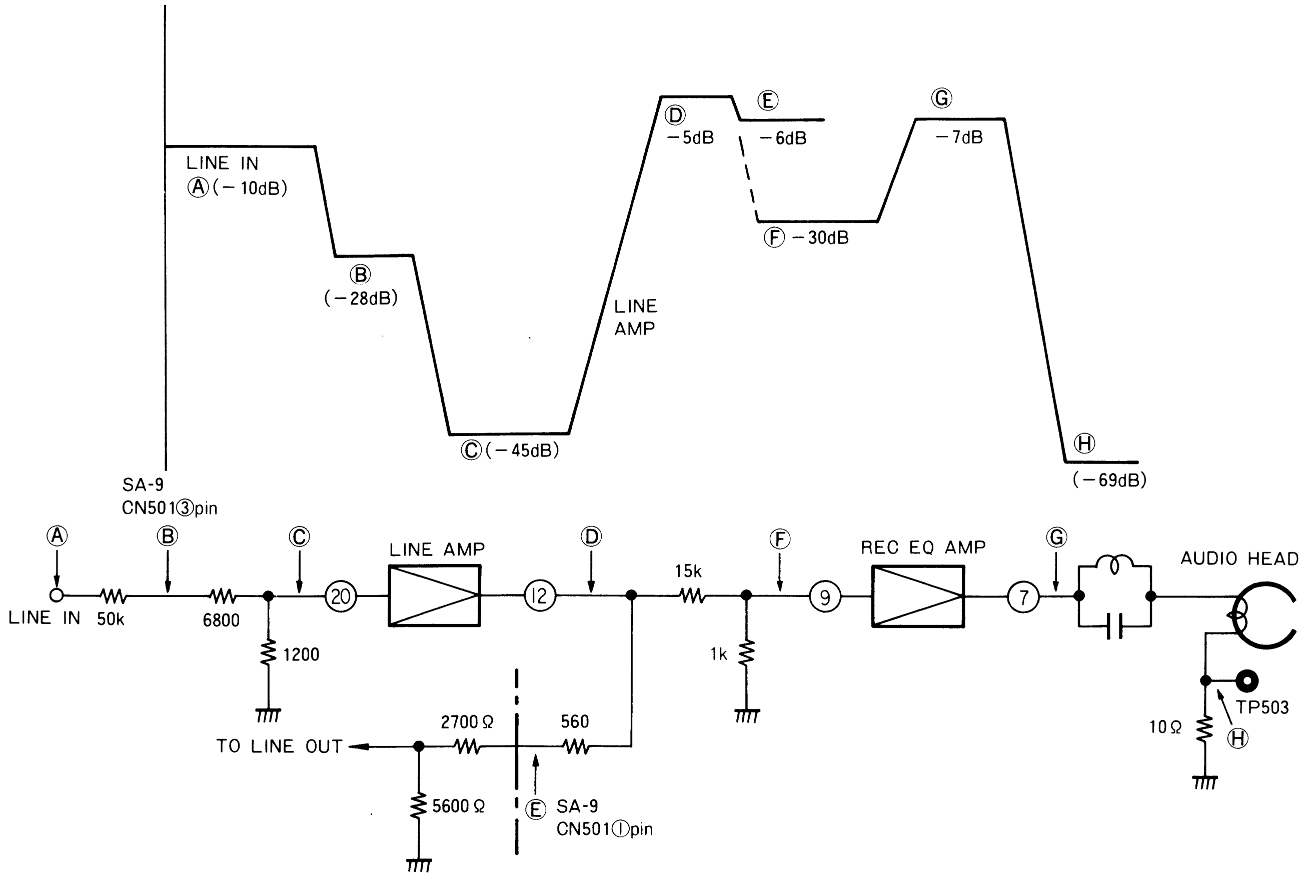

a CH HEAD
b CH HEAD
T001
T002
Q009~011
a CH PB AMP
Q012, 013
REC/PB SWITCH
PB 12V
Q014, 015
b CH PB AMP
Q017, 018
REC/PB SWITCH
PB 12V
FL001
BPF f1 1.44MHz
FL002
BPF f1 1.44MHz
FL003
BPF f2 2.1MHz
FL004
BPF f2 2.1MHz
IC003(1/2)
a CH f1 PB AMP
b CH f1 PB AMP
a CH f2 PB AMP
b CH f2 PB AMP
VCA
D.O DET
AF SWP
RV009
VCA
PB 5V
RV003
DEM fo L
RV002
PB LEVEL
RV001
PB LEVEL
IC002
IC008
LIMITER
DEMOD 1
DEMOD 2
150kHz LPF
10dB AMP
TPG
MUTE
NORMAL
LPF
S/H
D.O
3dB AMP
SW CONT
HPF
AFM DET
2 SEC
AF SWP
PB 5V
RV017
D008, 009, 038
REC AFM MUTE
D LOCK
REC.PAUSE
Q026
THERMAL COMPENSTOR
RV006
f1 ADJ
RV007
f1 DEVIATION
Q027
RV010
f2 DEVIATION
RV011
f2 ADJ
IC003(1/2)
MOD 1
MOD 2
AGC
REF
RV104
REC LEVEL
Q024
BUFFER
Q025
LPF
MIX
Q019~021
REC AMP
Q059, 060
REC/PB SWITCH
REC PAUSE
POWER BLOCK
UN 12V
SW 12V
SW 9V
Q049, 050
PB 12V SWITCH
PB 12V
Q058
5V REG
5V
Q065
REC.P 5V SWITCH
REC.P 5V
SERVO/ SYSTEM CONTROL BLOCK
PB
REC.P
AF SWP
A MUTE
D LOCK
AV CONT
AV/A
REC. PAUSE


MUTE
NORMAL
3dB AMP
LPF
S/H
D.O
SW CONT
MUTE
HPF
AFM DET
2 SEC
PB
REC
FL005
LPF
Q039~041
20/15kHz SWITCH
FL006
Q042~044
PB 12V
Q045
LOGIC
AUDIO SEL
EMPH 3
MAX GAIN PASS
MIN, GAIN PASS
WHIGHT
LIMITER
IC004
MOA
EMPH 2
VCA
DET
EMPH I
IC005
AMP
MIX
IC006
Q037
Q038
Q062
Q063
BUFFER
D018
D019
INHIBIT
Q032,061,
034,064
AUDIO SELECT LOGIC
PB AFM
A MUTE
Q028,031
AUDIO MUTE & POWER FAIL.DET
SW 12V
Q035
AUDIO OUT INHIBIT & AFM REC INHIBIT
AV CONT
Q001~006
AV SWITCH
CN012
AV CONNECTOR
CNJ001(1/4)
AUDIO OUT (L)
AUDIO OUT (R)
HEAD PHONE AMP
LEVEL METER
FU-37 BOARD
AUDIO/NORMAL
S008
BATA HIFI AUDIO OUT
MPX
S010
MPX FILTER
AUDIO SELECT
S011
INPUT SELECT
Q051,056,057
BETA HIFI LED LOGIC
PB. AFM
BATA HIFI
Q053,054
SOUND LED LOGIC
V DET
AV/A
D503
SOUND
RV501
REC LEVEL
(L)
(R)
TM-80 BOARD
IC001
TEST SIGNAL GENERATOR
Q067
NORMAL AUDIO MUTE
Q036
AFM/AM
AM MUTE
AM AUDIO IN
AM AUDIO OUT
NORMAL AUDIO BLOCK
RF MODULATOR
S001
TEST SIGNAL
AUDIO SEL
IC007(1/2)
AUDIO IN (L)
AUDIO IN (R)
Q066
AUDIO SEL
TU (L) IN
TU (R) IN
TUNER BLOCK
Q052
MUTE +V DET
AF-7 BOARD

3-16. AUDIO LEVEL DIAGRAM (REC)

REC MODE

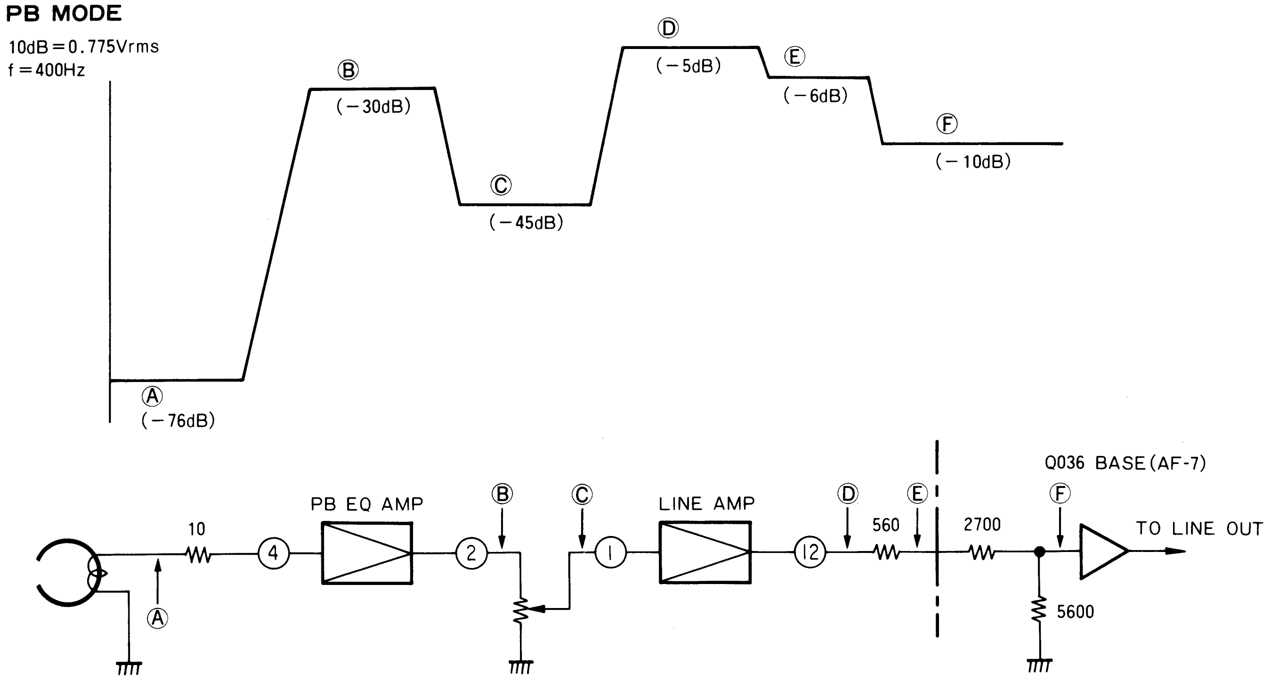
0dB=0.775Vrms
f=400Hz
BIAS OSC : STOPPED


LINE IN
Ⓐ(−10dB)
Ⓑ
(−28dB)
Ⓒ(−45dB)
LINE
AMP
Ⓓ
−5dB
Ⓔ
−6dB
Ⓕ −30dB
Ⓖ
−7dB
Ⓗ
(−69dB)
SA-9
CN501③pin
Ⓐ
Ⓑ
Ⓒ
LINE AMP
Ⓓ
Ⓕ
REC EQ AMP
Ⓖ
AUDIO HEAD
LINE IN
50k
6800
1200
20
12
15k
1k
9
7
TP503
10Ω
Ⓗ
TO LINE OUT
2700Ω
560
5600Ω
Ⓔ SA-9
CN501①pin

3-17. AUDIO LEVEL DIAGRAM (PB)

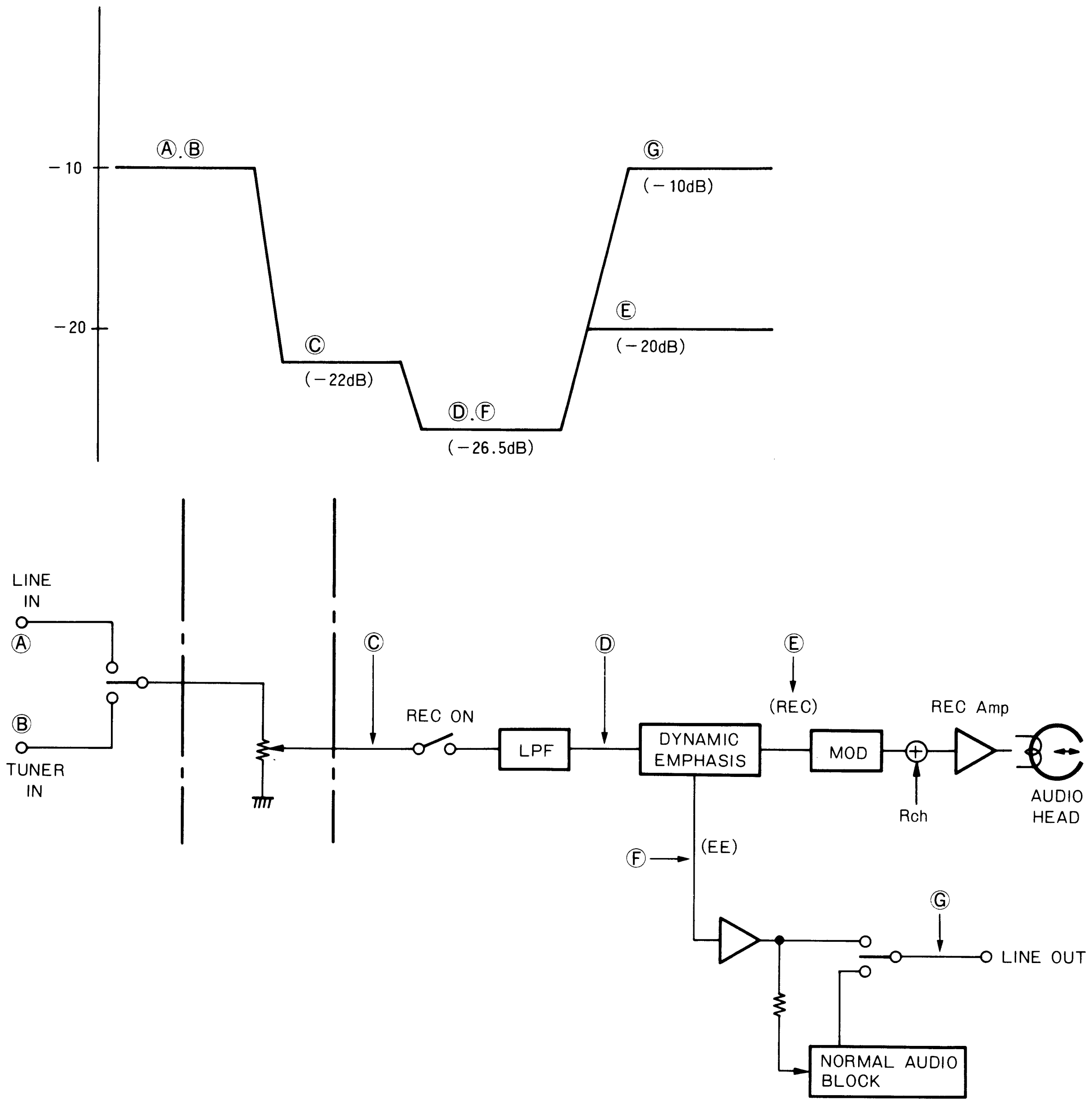
PB MODE

10dB=0.775Vrms
f=400Hz


Ⓐ
(−76dB)
Ⓑ
(−30dB)
Ⓒ
(−45dB)
Ⓓ
(−5dB)
Ⓔ
(−6dB)
Ⓕ
(−10dB)
PB EQ AMP
LINE AMP
Q036 BASE(AF-7)
TO LINE OUT
10
4
2
1
12
560
2700
5600
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
Ⓕ

3-18. AFM LEVEL DIAGRAM (REC, EE)

REC, EE MODE


−10
−20
Ⓐ.Ⓑ
Ⓒ
(−22dB)
Ⓓ.Ⓕ
(−26.5dB)
Ⓖ
(−10dB)
Ⓔ
(−20dB)
LINE
IN
Ⓐ
Ⓑ
TUNER
IN
Ⓒ
REC ON
LPF
Ⓓ
DYNAMIC
EMPHASIS
Ⓔ
(REC)
MOD
REC Amp
Rch
AUDIO
HEAD
Ⓕ
(EE)
Ⓖ
LINE OUT
NORMAL AUDIO
BLOCK

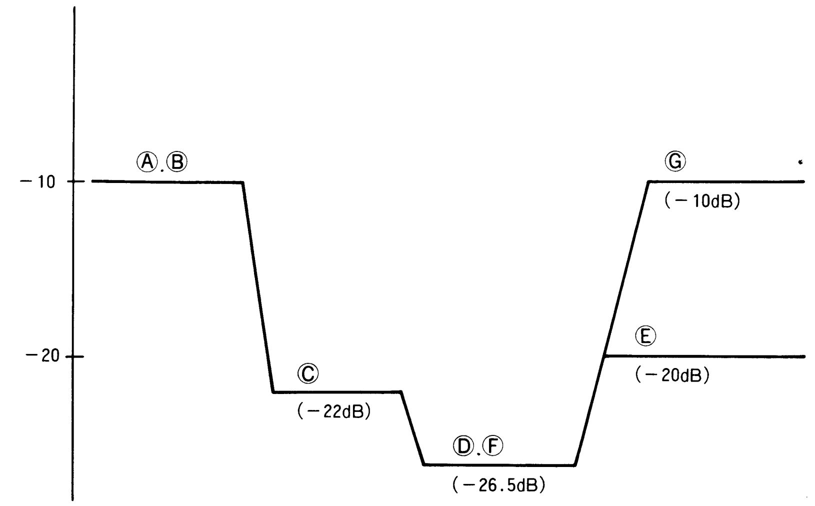
3-19.

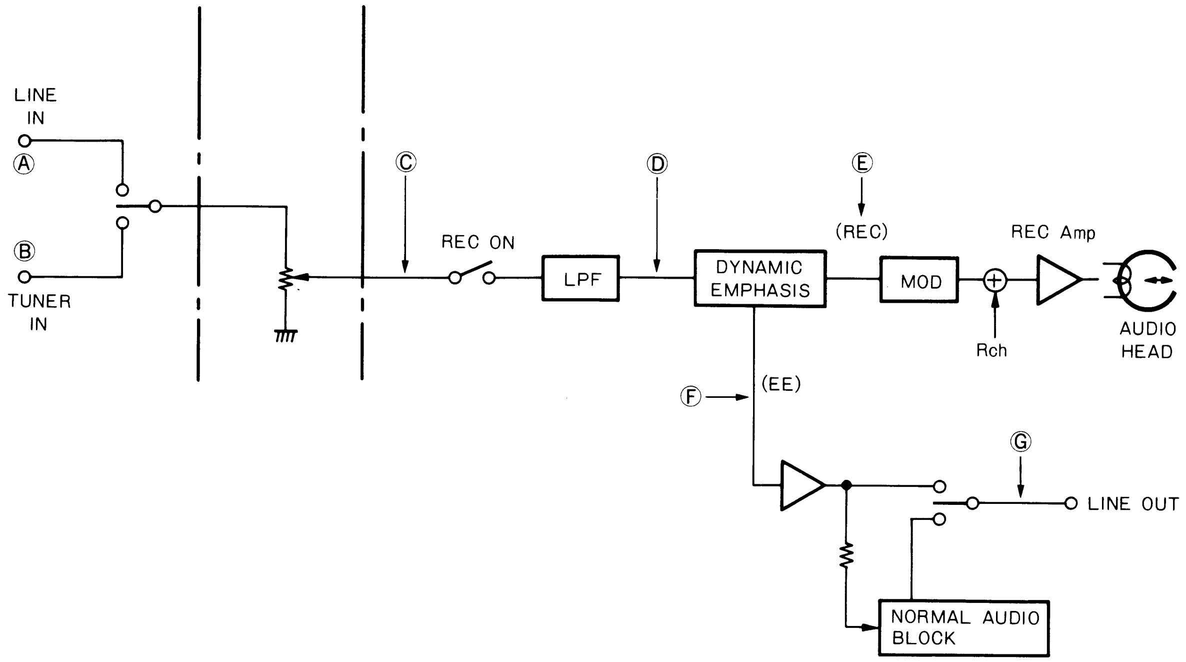
PB MO

DIO HEAD
TP503
Ⓗ
(AF-7)
O LINE OUT

3-18. AFM LEVEL DIAGRAM (REC, EE)

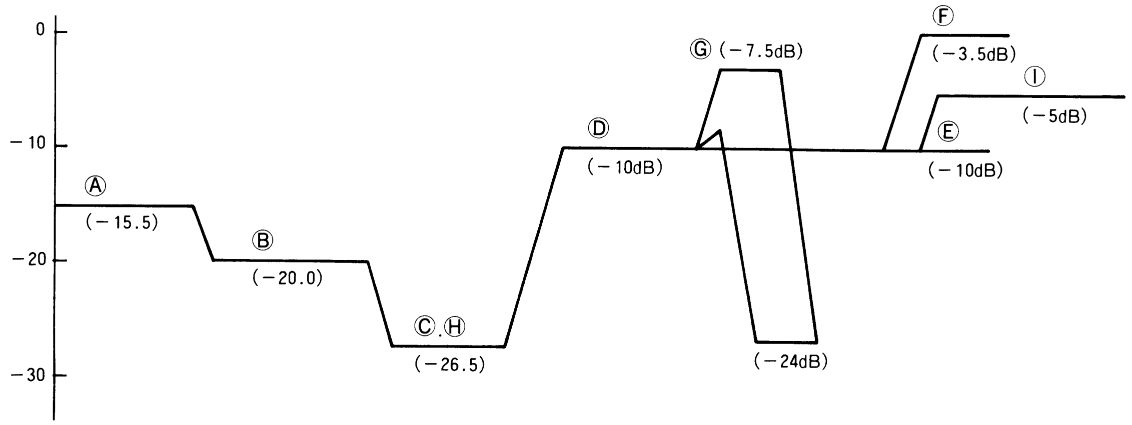
$\overline{\text{REC}}$, EE MODE

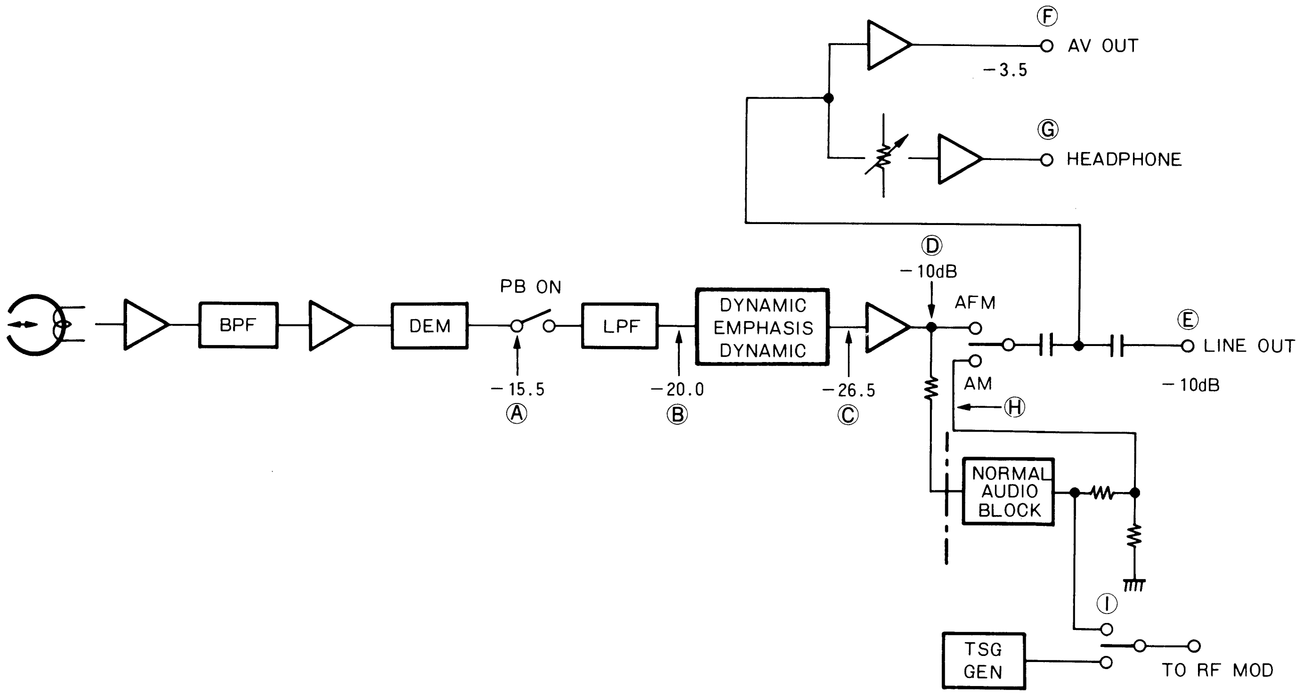



LINE IN
Ⓐ
Ⓑ
TUNER IN
Ⓒ
REC ON
LPF
Ⓓ
DYNAMIC EMPHASIS
Ⓔ
(REC)
MOD
Rch
REC Amp
AUDIO HEAD
Ⓕ
(EE)
Ⓖ
LINE OUT
NORMAL AUDIO BLOCK

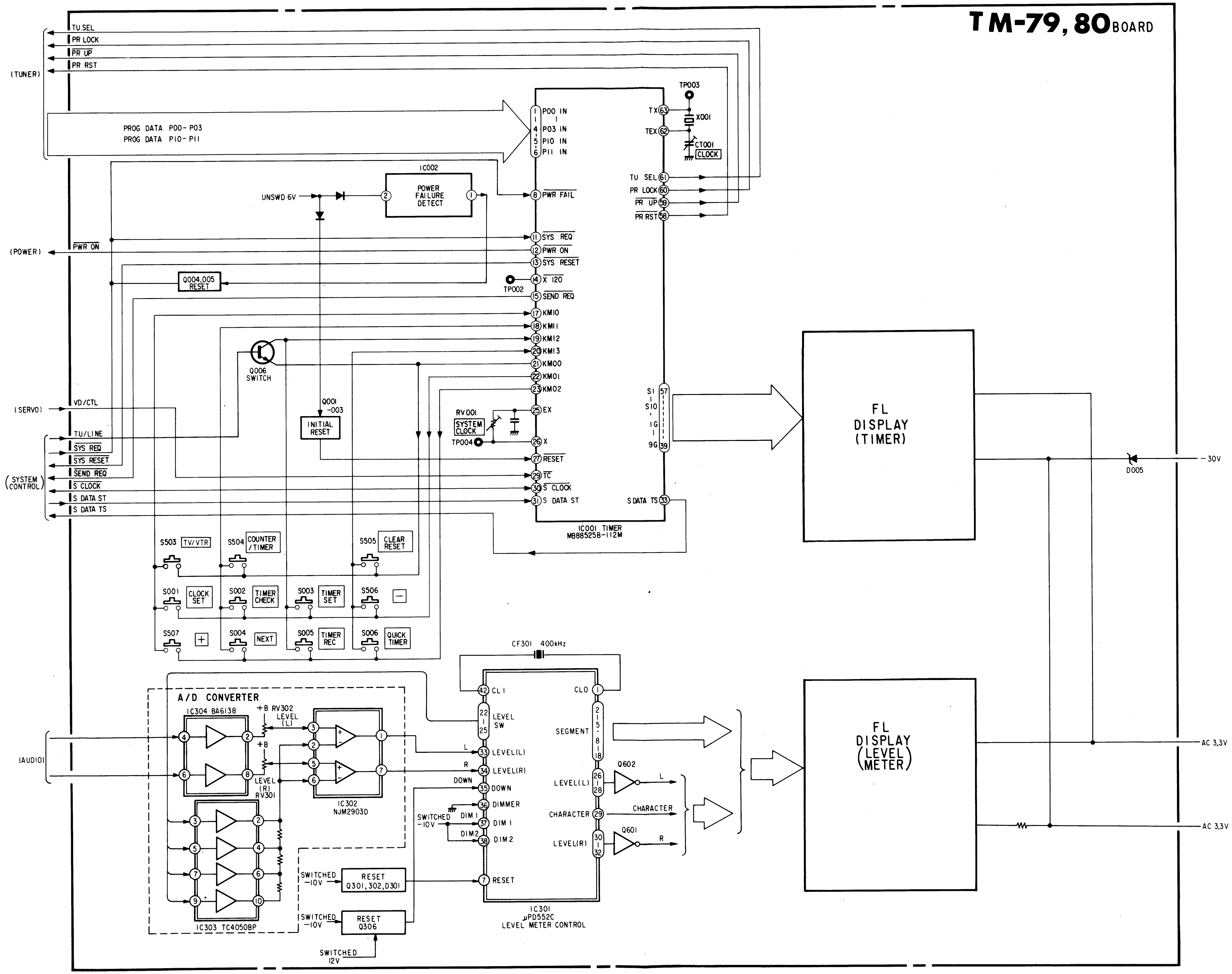
3-19. AFM LEVEL DIAGRAM (PB)

PB MODE

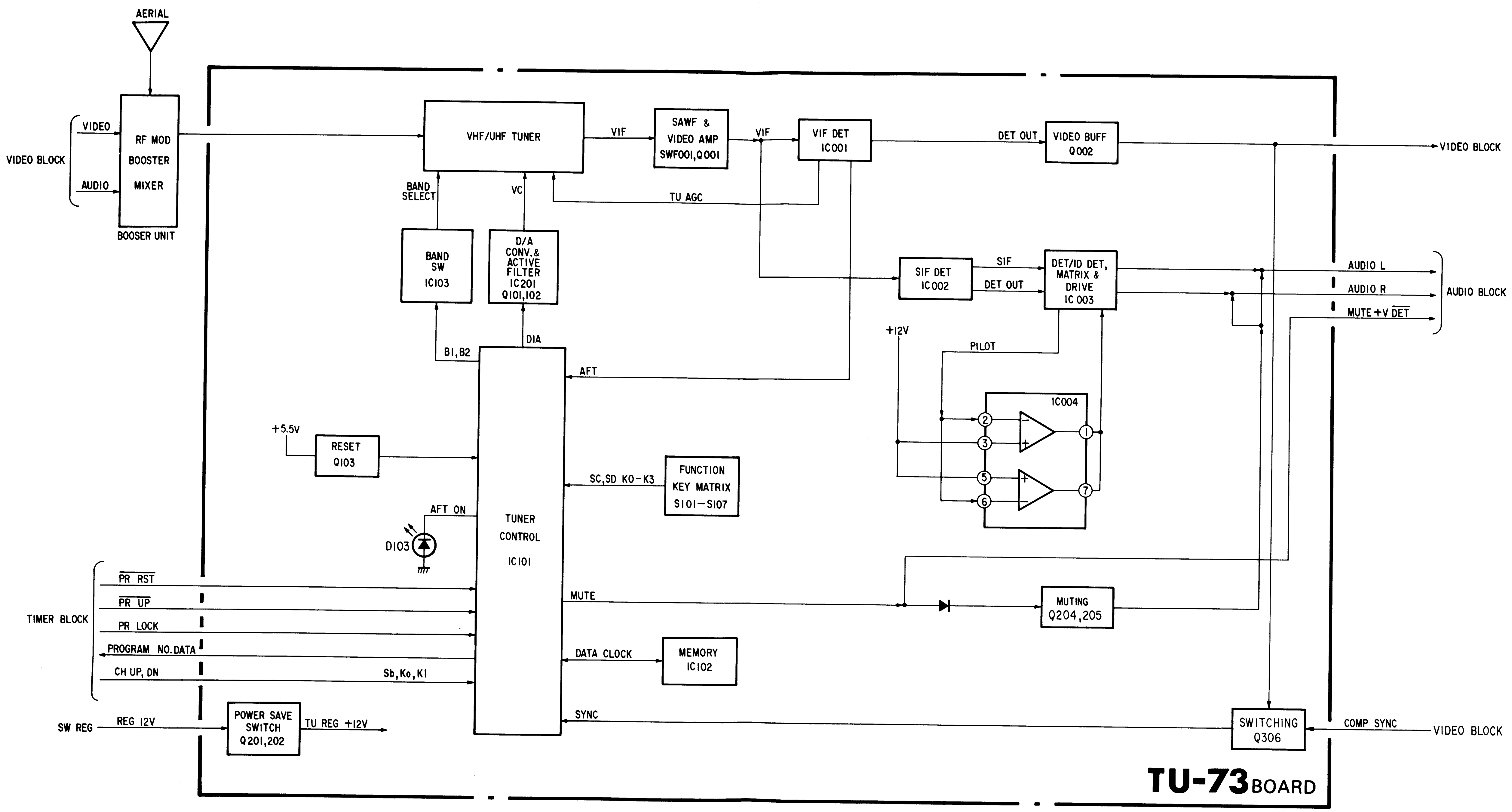



BPF
DEM
PB ON
LPF
DYNAMIC EMPHASIS DYNAMIC
-15.5
Ⓐ
-20.0
Ⓑ
-26.5
Ⓒ
Ⓓ
-10dB
AFM
AM
Ⓗ
Ⓕ
AV OUT
-3.5
Ⓖ
HEADPHONE
Ⓔ
LINE OUT
-10dB
NORMAL AUDIO BLOCK
Ⓘ
TSG GEN
TO RF MOD

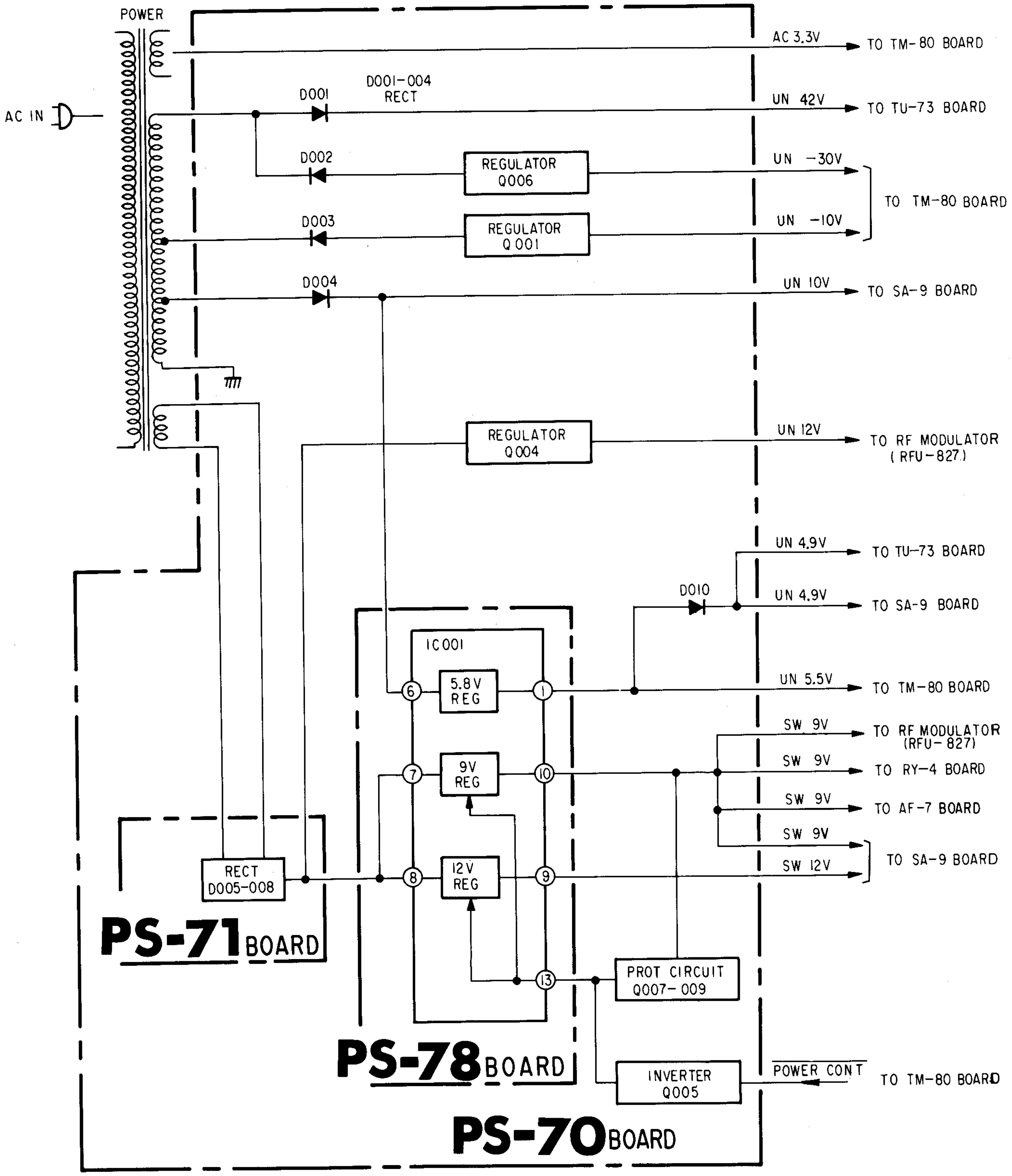
3-20. TIMER BLOCK DIAGRAM


TM-79, 80 BOARD
(TUNER)
TU SEL
PR LOCK
PR UP
PR RST
PROG DATA P00-P03
PROG DATA P10-P11
IC002
POWER FAILURE DETECT
UNSWD 6V
(POWER)
PWR ON
Q004,005 RESET
Q006 SWITCH
Q001 -003
INITIAL RESET
(SERVO)
VD/CTL
TU/LINE
SYS REQ
SYS RESET
SEND REQ
S CLOCK
S DATA ST
S DATA TS
(SYSTEM CONTROL)
RV001
SYSTEM CLOCK
TP004
TP002
TP003
X001
CT001
CLOCK
P00 IN
P03 IN
P10 IN
P11 IN
PWR FAIL
SYS REQ
PWR ON
SYS RESET
X 120
SEND REQ
KMI0
KMI1
KMI2
KMI3
KMO0
KMO1
KMO2
EX
X
RESET
TC
S CLOCK
S DATA ST
TX
TEX
TU SEL
PR LOCK
PR UP
PR RST
S1 - S10
1G - 9G
S DATA TS
IC001 TIMER MB88525B-112M
FL DISPLAY (TIMER)
D005
-30V
S503 TV/VTR
S504 COUNTER /TIMER
S505 CLEAR RESET
S001 CLOCK SET
S002 TIMER CHECK
S003 TIMER SET
S506 −
S507 +
S004 NEXT
S005 TIMER REC
S006 QUICK TIMER
CF301 400kHz
A/D CONVERTER
IC304 BA6138
+B RV302 LEVEL (L)
+B
LEVEL (R) RV301
IC302 NJM2903D
(AUDIO)
IC303 TC4050BP
SWITCHED −10V
RESET Q301,302,D301
RESET Q306
SWITCHED 12V
CL I
CLO
LEVEL SW
SEGMENT
LEVEL(L)
LEVEL(R)
DOWN
DIMMER
DIM 1
DIM 2
RESET
CHARACTER
Q602
Q601
L
R
IC301 μPD552C LEVEL METER CONTROL
FL DISPLAY (LEVEL METER)
AC 3,3V
AC 3,3V

3-21. TUNER BLOCK DIAGRAM


AERIAL
VIDEO BLOCK
VIDEO
AUDIO
RF MOD
BOOSTER
MIXER
BOOSER UNIT
VHF/UHF TUNER
VIF
SAWF &
VIDEO AMP
SWF001,Q001
VIF
VIF DET
IC001
DET OUT
VIDEO BUFF
Q002
VIDEO BLOCK
BAND SELECT
VC
TU AGC
BAND SW
IC103
D/A CONV.&
ACTIVE FILTER
IC201
Q101,102
SIF DET
IC002
SIF
DET OUT
DET/ID DET,
MATRIX &
DRIVE
IC 003
AUDIO L
AUDIO R
MUTE+V DET
AUDIO BLOCK
+12V
PILOT
B1,B2
DIA
AFT
IC004
2
3
5
6
1
7
+5.5V
RESET
Q103
SC,SD K0-K3
FUNCTION
KEY MATRIX
S101-S107
AFT ON
D103
TUNER
CONTROL
IC101
TIMER BLOCK
PR RST
PR UP
PR LOCK
PROGRAM NO.DATA
CH UP, DN
Sb,Ko,K1
MUTE
MUTING
Q204,205
DATA CLOCK
MEMORY
IC102
SW REG
REG 12V
POWER SAVE
SWITCH
Q201,202
TU REG +12V
SYNC
SWITCHING
Q306
COMP SYNC
VIDEO BLOCK
TU-73 BOARD

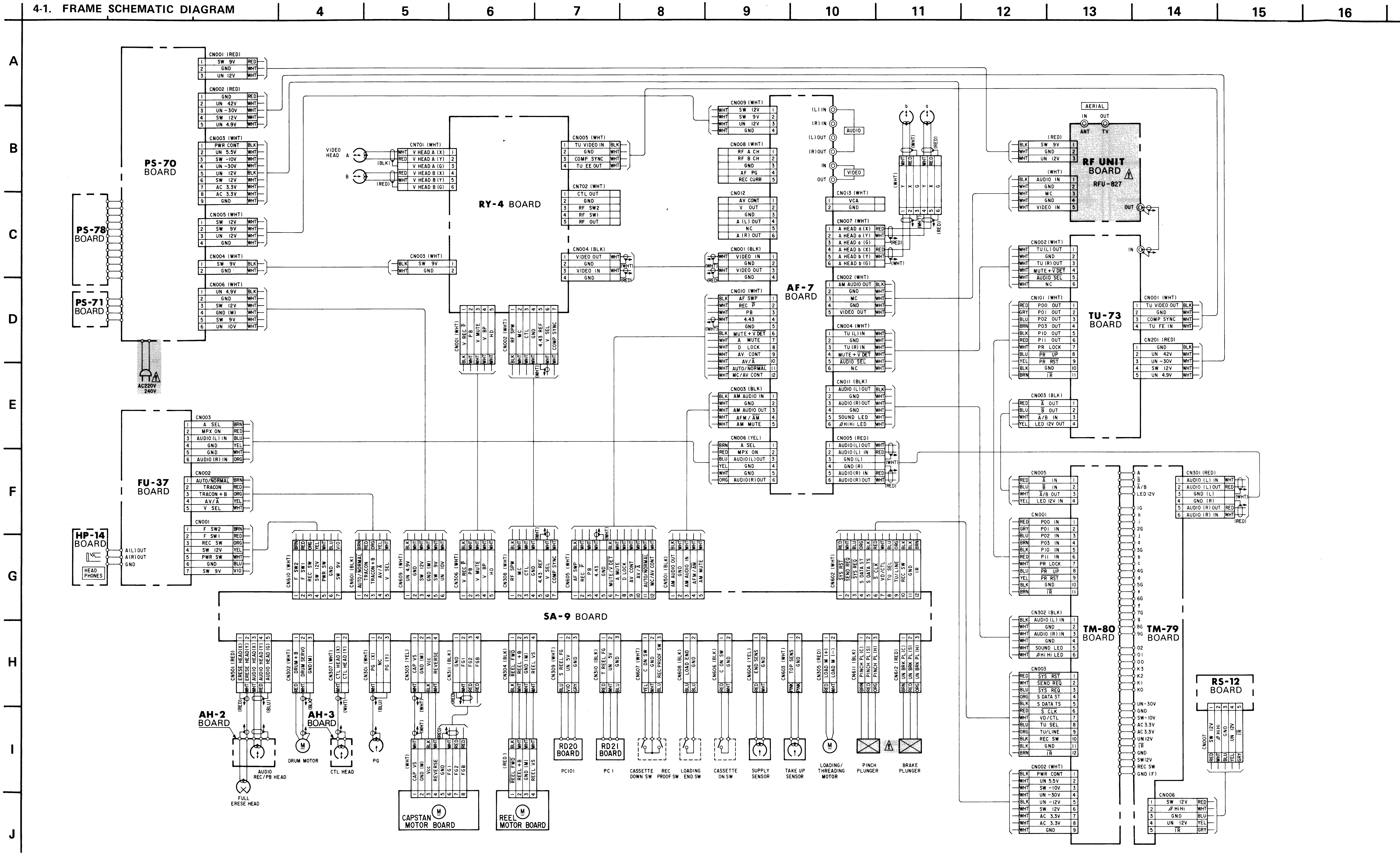
3-22. POWER BLOCK DIAGRAM


POWER
AC IN
AC 3.3V
TO TM-80 BOARD
D001
D001-004
RECT
UN 42V
TO TU-73 BOARD
D002
REGULATOR
Q006
UN -30V
TO TM-80 BOARD
D003
REGULATOR
Q001
UN -10V
D004
UN 10V
TO SA-9 BOARD
REGULATOR
Q004
UN 12V
TO RF MODULATOR
(RFU-827)
UN 4.9V
TO TU-73 BOARD
D010
UN 4.9V
TO SA-9 BOARD
IC001
5.8V
REG
⑥
①
UN 5.5V
TO TM-80 BOARD
SW 9V
TO RF MODULATOR
(RFU-827)
9V
REG
⑦
⑩
SW 9V
TO RY-4 BOARD
SW 9V
TO AF-7 BOARD
SW 9V
TO SA-9 BOARD
RECT
D005-008
12V
REG
⑧
⑨
SW 12V
PS-71 BOARD
⑬
PROT CIRCUIT
Q007-009
PS-78 BOARD
INVERTER
Q005
POWER CONT
TO TM-80 BOARD
PS-70 BOARD

SECTION 4

SCHEMATIC DIAGRAM, PRINTED WIRING BOARDS

4-1. FRAME SCHEMATIC DIAGRAM


4
5
6
7
8
9
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
PS-70 BOARD
PS-78 BOARD
PS-71 BOARD
AC220V 240V
CN001 (RED)
SW 9V
GND
UN 12V
CN002 (RED)
UN 42V
UN -30V
SW 12V
UN 4.9V
CN003 (WHT)
PWR CONT
UN 5.5V
SW -10V
AC 3.3V
CN005 (WHT)
CN004 (WHT)
CN006 (WHT)
GND (M)
UN 10V
RY-4 BOARD
VIDEO HEAD
CN701 (WHT)
V HEAD A (X)
V HEAD A (Y)
V HEAD A (G)
V HEAD B (X)
V HEAD B (Y)
V HEAD B (G)
CN005 (WHT)
TU VIDEO IN
COMP SYNC
TU EE OUT
CN702 (WHT)
CTL OUT
RF SW2
RF SW1
RF OUT
CN004 (BLK)
VIDEO OUT
VIDEO IN
CN003 (WHT)
CN001 (WHT)
CN002 (WHT)
V REC P
PB
V MUTE
V BP
HD
RF SPW
MC
CTL
4.43 REF
V SEL
AF-7 BOARD
CN009 (WHT)
CN008 (WHT)
RF A CH
RF B CH
AF PG
REC CURR
CN012
AV CONT
V OUT
A (L) OUT
NC
A (R) OUT
CN001 (BLK)
CN010 (WHT)
AF SWP
MUTE + V DET
A MUTE
D LOCK
AV/Ā
AUTO/NORMAL
MC/AV CONT
CN003 (BLK)
AM AUDIO IN
AM AUDIO OUT
AFM / AM
AM MUTE
CN006 (YEL)
A SEL
MPX ON
AUDIO (L) OUT
AUDIO (R) OUT
(L) IN
(R) IN
(L) OUT
(R) OUT
IN
OUT
AUDIO
VIDEO
CN013 (WHT)
VCA
CN007 (WHT)
A HEAD a (X)
A HEAD a (Y)
A HEAD a (G)
A HEAD b (X)
A HEAD b (Y)
A HEAD b (G)
CN002 (WHT)
AM AUDIO OUT
VIDEO OUT
CN004 (WHT)
TU (L) IN
TU (R) IN
AUDIO SEL
CN011 (BLK)
SOUND LED
β HiHi LED
CN005 (RED)
AUDIO (L) IN
GND (L)
GND (R)
AUDIO (R) IN
AERIAL
ANT
TV
RF UNIT BOARD
RFU-827
CN002 (WHT)
TU (L) OUT
TU (R) OUT
MUTE + V DET
TU-73 BOARD
CN101 (WHT)
P00 OUT
P01 OUT
P02 OUT
P03 OUT
P10 OUT
P11 OUT
PR LOCK
PR UP
PR RST
IR
CN001 (WHT)
TU VIDEO OUT
TU FE IN
CN201 (RED)
CN003 (BLK)
A OUT
B OUT
A/B IN
LED 12V OUT
TM-80 BOARD
TM-79 BOARD
CN005
CN001
CN302 (BLK)
CN003
SYS RST
SEND REQ
SYS REQ
S DATA ST
S DATA TS
S CLK
VD/CTL
TU SEL
TU/LINE
REC SW
CN002 (WHT)
UN -12V
CN301 (RED)
CN006
β HiHi
RS-12 BOARD
CN007
FU-37 BOARD
CN003
AUDIO (L) IN
AUDIO (R) IN
CN002
AUTO/NORMAL
TRACON
TRACON + B
V SEL
CN001
F SW2
F SW1
REC SW
PWR SW
HP-14 BOARD
HEAD PHONES
A (L) OUT
A (R) OUT
SA-9 BOARD
CN610 (WHT)
CN601 (BLK)
CN609 (WHT)
CN306 (WHT)
CN308 (WHT)
CN605 (WHT)
CN501 (BLK)
CN602 (WHT)
CN501 (RED)
ERESE HEAD (X)
ERESE HEAD (Y)
AUDIO HEAD (X)
AUDIO HEAD (Y)
CN302 (WHT)
DRUM + B
DRUM SERVO
CN307 (WHT)
CTL HEAD (X)
CTL HEAD (Y)
CN301 (WHT)
PG (X)
PG (Y)
CN303 (YEL)
CAP VS
VCC
REVERSE
FG1
FG2
FGB
CN311 (BLK)
CN304 (BLK)
REEL FWD
REEL + B
REEL VS
CN309 (WHT)
S REEL FG
UN 5V
CN310 (BLK)
T REEL FG
CN607 (WHT)
C DN SW
REC PROOF SW
CN608 (BLK)
LOAD END
CN606 (BLK)
C ON SW
CN604 (YEL)
END SENS
CN603 (WHT)
TOP SENS
CN305 (RED)
LOAD M (+)
LOAD M (-)
CN611 (BLK)
PINCH PL (C)
PINCH PL (S)
PINCH PL (H)
CN612 (RED)
UN BRK PL (C)
UN BRK PL (S)
UN BRK PL (H)
AH-2 BOARD
AH-3 BOARD
AUDIO REC/PB HEAD
FULL ERESE HEAD
DRUM MOTOR
CTL HEAD
PG
CAPSTAN MOTOR BOARD
REEL MOTOR BOARD
RD20 BOARD
RD21 BOARD
PC101
PC1
CASSETTE DOWN SW
REC PROOF SW
LOADING END SW
CASSETTE ON SW
SUPPLY SENSOR
TAKE UP SENSOR
LOADING/THREADING MOTOR
PINCH PLUNGER
BRAKE PLUNGER

7 18 19

A
B
C
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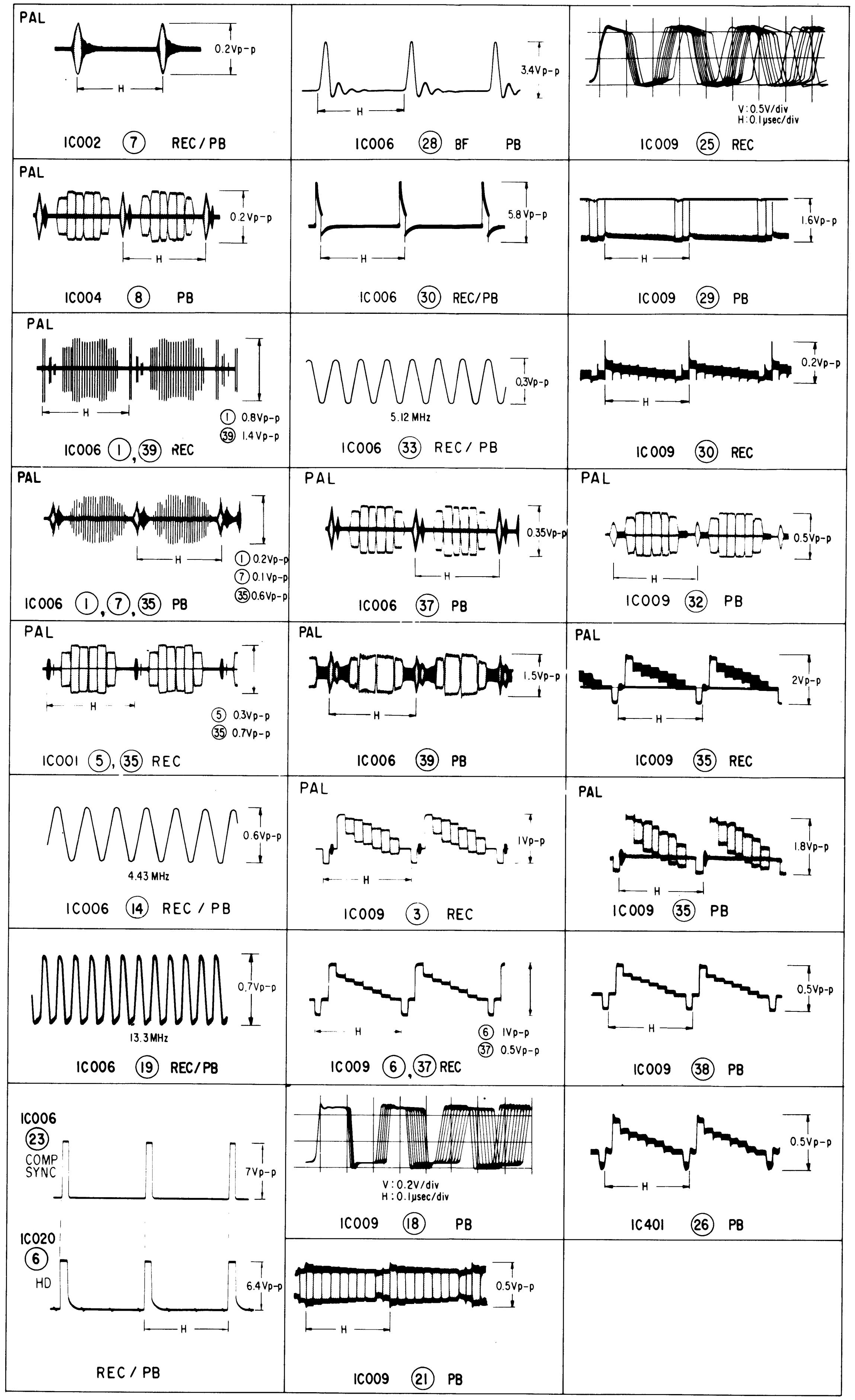
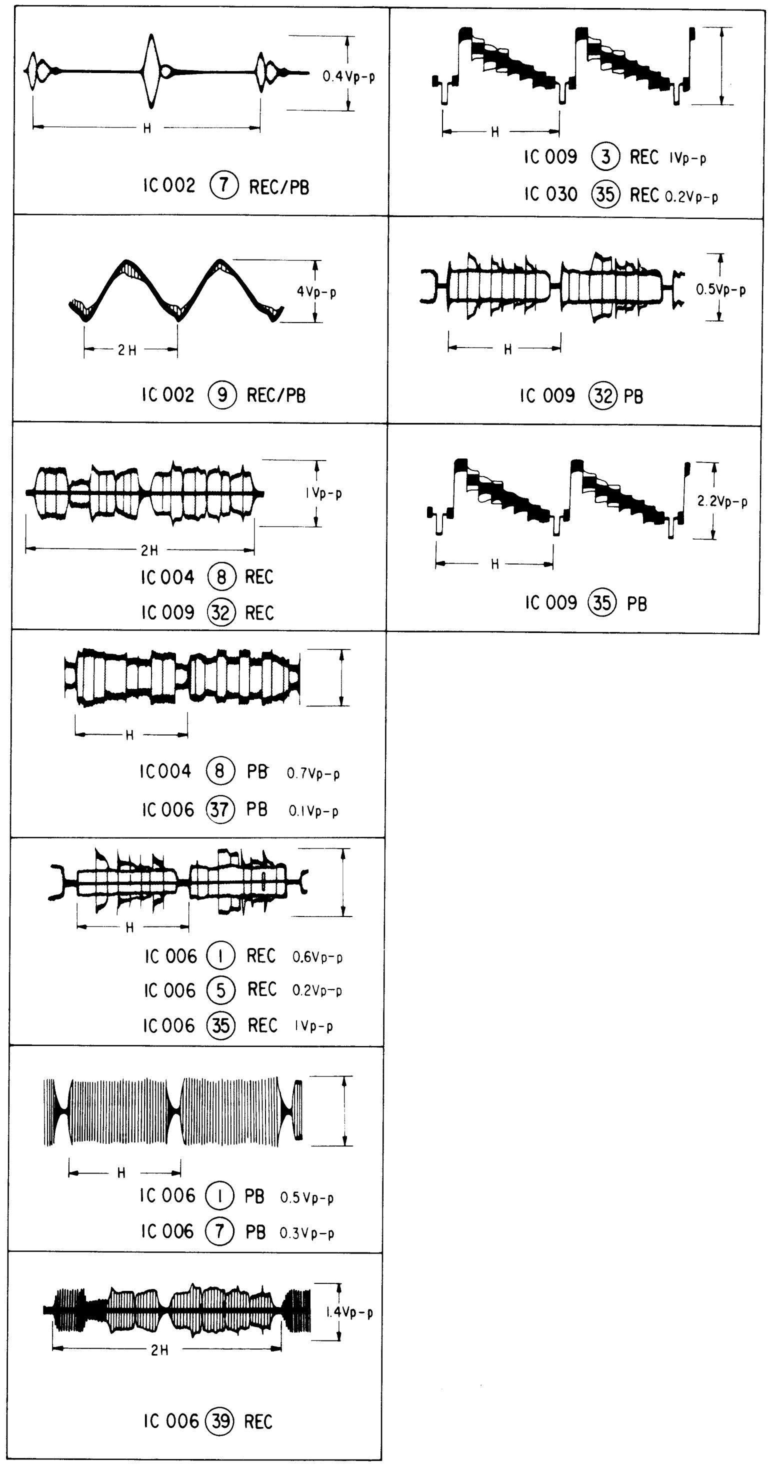
J

RY-4 BOARD (PAL/SECAM)

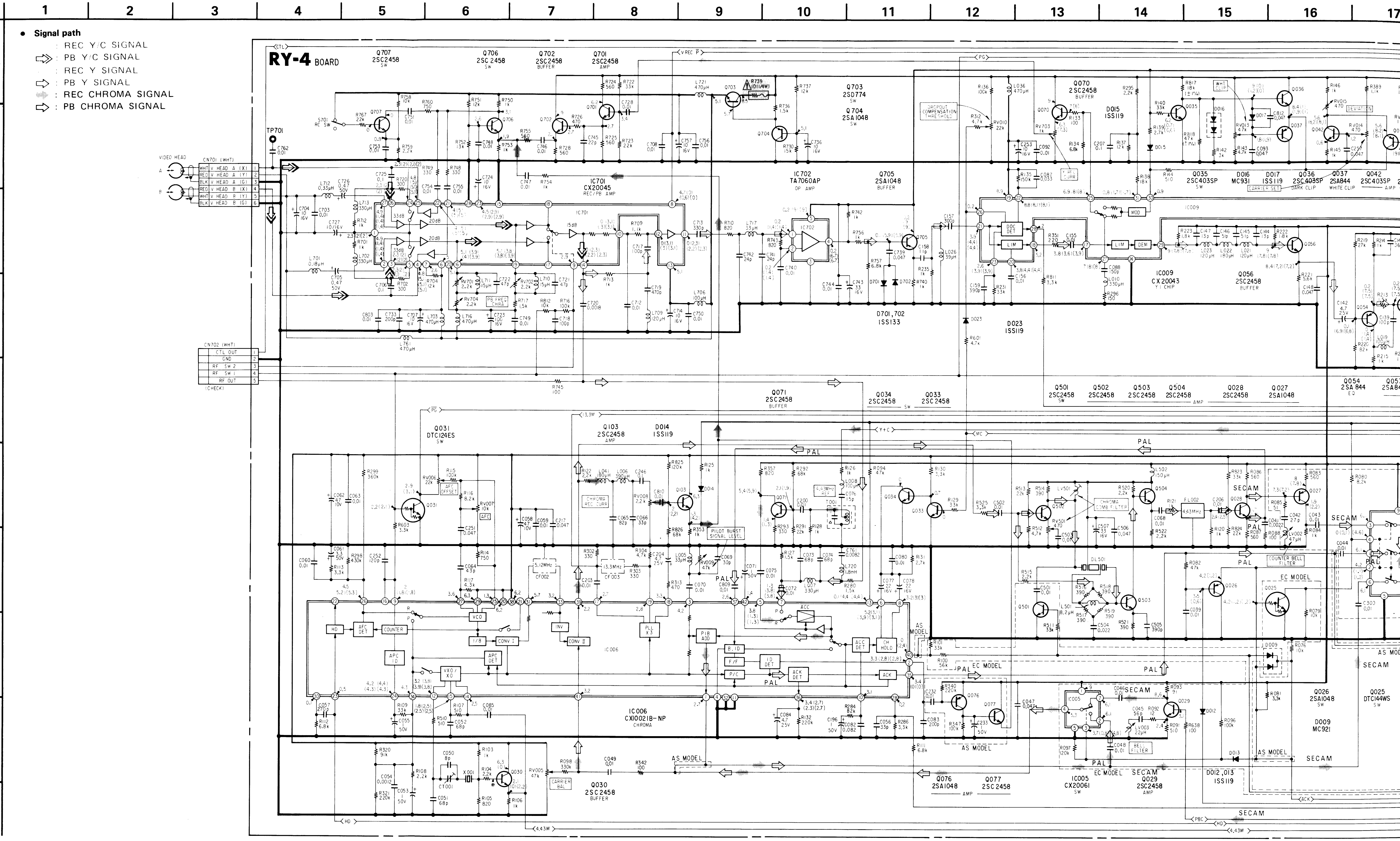


RY-4 BOARD (SECAM)



4-2. RY-4 (Y.C SIGNAL PROCESS) SCHEMATIC DIAGRAM

– Ref. No. RY-4 BOARD: 1,000 series –



- **Signal path**

: REC Y/C SIGNAL
⇨ : PB Y/C SIGNAL
: REC Y SIGNAL
⇨ : PB Y SIGNAL
: REC CHROMA SIGNAL
⇨ : PB CHROMA SIGNAL

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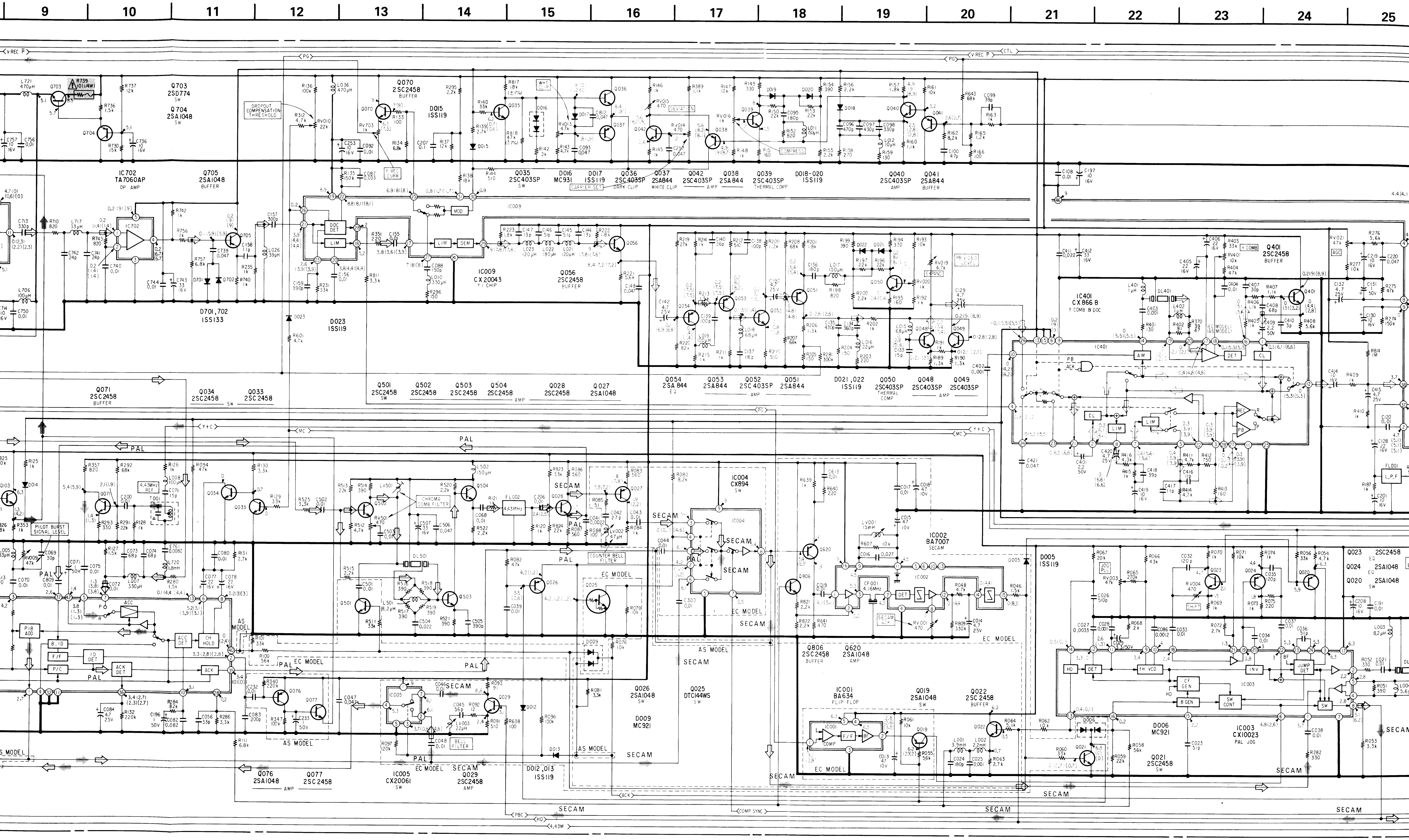
A
B
C
D
E
F
G
H
I
J
RY-4 BOARD
VIDEO HEAD
CN701 (WHT)
V HEAD A (X)
V HEAD A (Y)
V HEAD A (G)
V HEAD B (X)
V HEAD B (Y)
V HEAD B (G)
CN702 (WHT)
CTL OUT
GND
RF SW 2
RF SW 1
RF OUT
(CHECK)
TP701
S701 RC SW
Q707 2SC2458 SW
Q706 2SC2458 SW
Q702 2SC2458 BUFFER
Q701 2SC2458 AMP
Q703 2SD774 SW
Q704 2SA1048 SW
IC701 CX20045 REC/PB AMP
IC702 TA7060AP OP AMP
Q705 2SA1048 BUFFER
D701,702 1SS133
D023 1SS119
DROPOUT COMPENSATION THRESHOLD
Q070 2SC2458 BUFFER
D015 1SS119
Q035 2SC403SP SW
D016 MC931
D017 1SS119
Q036 2SC403SP DARK CLIP
Q037 2SA844 WHITE CLIP
Q042 2SC403SP AMP
WHT CLIP
DEVIATION
CARRIER SET
IC009 CX20043 Y/ CHIP
DOC DET
LIM
MOD
DEM
Q056 2SC2458 BUFFER
Q054 2SA844 EQ
Q501 2SC2458 SW
Q502 2SC2458
Q503 2SC2458
Q504 2SC2458
Q028 2SC2458 AMP
Q027 2SA1048
Q071 2SC2458 BUFFER
Q034 2SC2458
Q033 2SC2458 SW
Q031 DTC124ES SW
Q103 2SC2458 AMP
D014 1SS119
AFC OFFSET
AFC
CHROMA REC CURR
PILOT BURST SIGNAL LEVEL
4.43MHz REF
CHROMA COMB FILTER
COUNTER BELL FILTER
EC MODEL
AS MODEL
SECAM
PAL
IC006 CX10021B-NP CHROMA
HD
AFC DET
COUNTER
APC ID
VCO
1/8
CONV I
APC DET
VXO/XO
INV
CONV II
PLL X3
PB ADD
B.ID
F/F
P/C
ID DET
ACK DET
ACC
ACC DET
CH HOLD
ACK
Q030 2SC2458 BUFFER
CARRIER BAL
Q076 2SA1048
Q077 2SC2458 AMP
IC005 CX20061 SW
Q029 2SC2458 AMP
BELL FILTER
D012,013 1SS119
Q026 2SA1048 SW
Q025 DTC144WS SW
D009 MC921
5.12MHz CF002
13.3MHz CF003
DL501
FL002 4.43MHz
CTL
V REC P
PG
13.3M
Y+C
MC
HD
4.43M
PBC
ACK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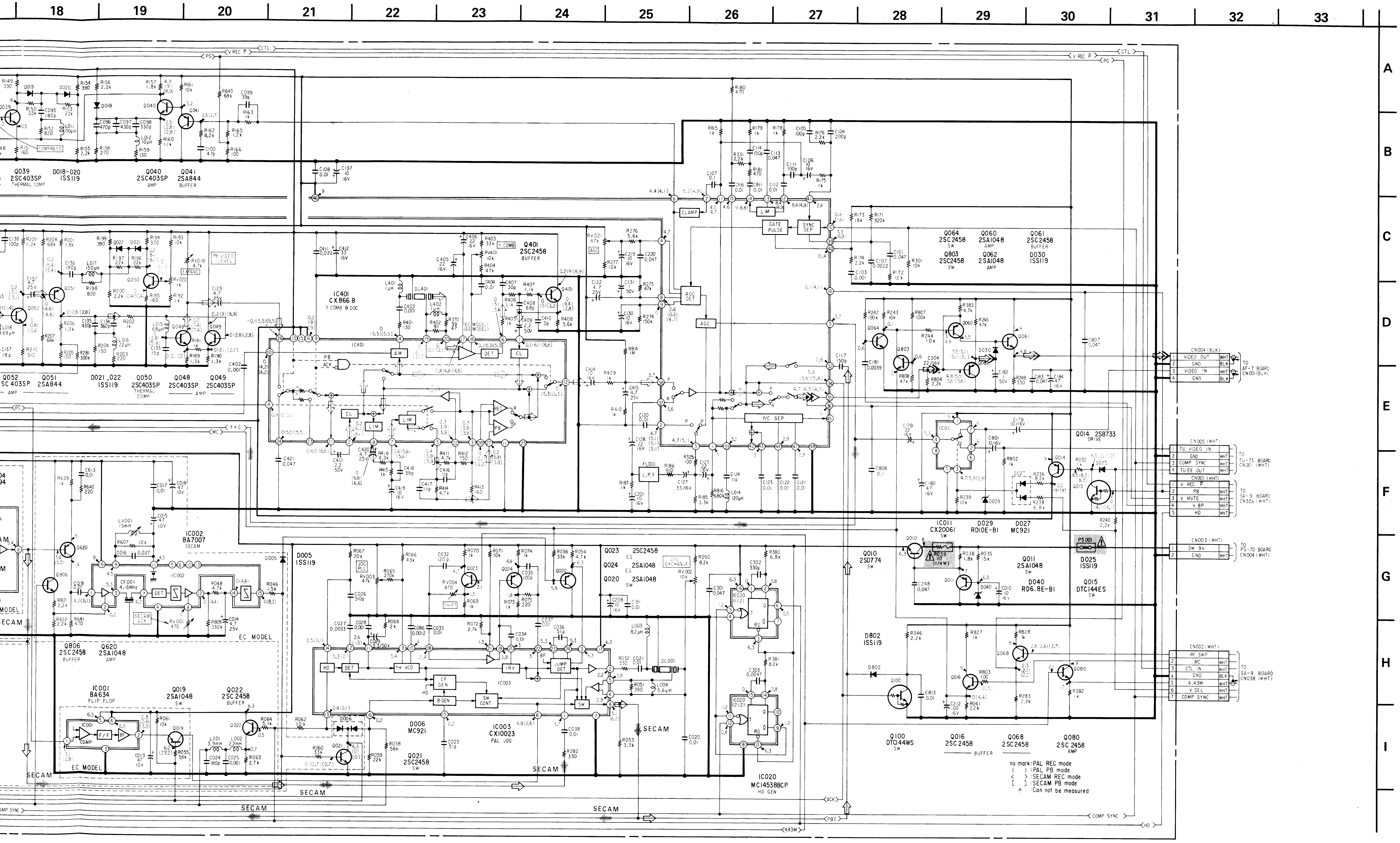
V REC P
PG
CTL
L721 470μH
Q703
R739 10(1/4W)
R737 12k
Q703 2SD774 SW
Q704 2SA1048 SW
R736 1.5k
R730 15k
C736 10 16V
Q704
DROPOUT COMPENSATION THRESHOLD
R312 4.7k
RV010 22k
R136 100k
L036 470μH
Q070 2SC2458 BUFFER
D015 1SS119
R295 2.2k
R140 33k
R817 18k
WHT CLIP
Q035
D016
Q036
R146 1k
RV015 470
DEVIATION
R389 1.1k
R147 10k
R149 330
D019
D020
R154 390
R156 2.2k
R157 1.8k
R161 10k
R643 68k
C099 39p
R163 1k
Q040
Q041
D018
IC702 TA7060AP OP AMP
Q705 2SA1048 BUFFER
R135 150k
C087 0.033
Y REC CURR
R144 510
MOD
Q035 2SC403SP SW
D016 MC931
D017 1SS119
Q036 2SC403SP
Q037 2SA844
Q042 2SC403SP
Q038 2SA844
Q039 2SC403SP
D018-020 1SS119
Q040 2SC403SP
Q041 2SA844
CARRIER SET
DARK CLIP
WHITE CLIP
AMP
THERMAL COMP
AMP
BUFFER
COMPRESS
C108 0.01
C197 10 16V
IC009
DOC DET
LIM
LIM
DEM
IC009 CX20043 Y1 CHIP
Q056 2SC2458 BUFFER
D701,702 1SS133
D023 1SS119
D023
R601 4.7k
Q054 2SA844 EQ
Q053 2SA844
Q052 2SC403SP
Q051 2SA844
AMP
D021,022 1SS119
Q050 2SC403SP THERMAL COMP
Q048 2SC403SP
Q049 2SC403SP
AMP
PB VIDEO LEVEL
EXPAND
IC401 CX866B Y COMB & DOC
Q401 2SC2458 BUFFER
Y COMB
AGC
EC MODEL
AS MODEL
AM
DET
CL
PB
ACK
CL
LIM
LIM
REC
PB
L.P.F
Q071 2SC2458 BUFFER
Q034 2SC2458
Q033 2SC2458
SW
Q501 2SC2458 SW
Q502 2SC2458
Q503 2SC2458
Q504 2SC2458
AMP
Q028 2SC2458
Q027 2SA1048
Y+C
MC
PAL
PAL
4.43MHz REF
T001
CHROMA COMB FILTER
FL002 4.43MHz
SECAM
SECAM
IC004 CX894 SW
SECAM
SECAM
IC002 BA7007 SECAM
D005 1SS119
Q023 2SC2458 EQ
Q024 2SA1048 EQ
Q020 2SA1048
PILOT BURST SIGNAL LEVEL
RV009 47k
ACC
P/B ADD
B.ID
F/F
ID DET
P/C
ACK DET
ACC DET
CH HOLD
ACK
AS MODEL
COUNTER BELL FILTER
EC MODEL
Q025
DL501
EC MODEL
SECAM
CF001 4.16MHz
DET
SECAM ACK
JOG PLL
CHIFT
HD
DET
fH VCO
CF GEN
B GEN
SW CONT
INV
JUMP DET
SW
PAL
EC MODEL
PAL
Q806 2SC2458 BUFFER
Q620 2SA1048 AMP
Q026 2SA1048 SW
Q025 DTC144WS SW
D009 MC921
IC001 BA634 FLIP FLOP
COMP
F/F
Q019 2SA1048 SW
Q022 2SC2458 BUFFER
D006 MC921
IC003 CX10023 PAL JOG
Q021 2SC2458 SW
AS MODEL
SECAM
BELL FILTER
IC005 CX20061 SW
Q029 2SC2458 AMP
D012,013 1SS119
AS MODEL
SECAM
EC MODEL
SECAM
Q076 2SA1048
Q077 2SC2458
AMP
SECAM
SECAM
SECAM
SECAM
SECAM
PBC
HD
4.43M
ACK
COMP SYNC



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A
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D
E
F
G
H
I
Q039 2SC403SP THERMAL COMP
D018-020 ISS119
Q040 2SC403SP AMP
Q041 2SA844 BUFFER
Q052 2SC403SP AMP
Q051 2SA844
D021,022 ISS119
Q050 2SC403SP THERMAL COMP
Q048 2SC403SP
Q049 2SC403SP AMP
PB VIDEO LEVEL
IC401 CX866B Y COMB & DOC
Q401 2SC2458 BUFFER
CLAMP
LIM
GATE PULSE
SYNC SEP
AGC DET
AGC
L.P.F
Y/C SEP
Q064 2SC2458 SW
Q060 2SA1048 AMP
Q061 2SC2458 BUFFER
Q803 2SC2458 SW
Q062 2SA1048 AMP
D030 ISS119
CN004 (BLK)
VIDEO OUT
GND
VIDEO IN
GND
TO AF-7 BOARD CN001(BLK)
IC011 CX20061 SW
D029 RD10E-B1
D027 MC921
Q014 2SB733 DRIVE
CN005 (WHT)
TU VIDEO IN
GND
COMP SYNC
TU EE OUT
TO TU-73 BOARD CN001 (WHT)
CN001 (WHT)
V REC P
PB
V MUTE
V BP
HD
TO SA-9 BOARD CN306 (WHT)
PS001
CN003 (WHT)
SW 9V
GND
TO PS-70 BOARD CN004 (WHT)
Q010 2SD774 SW
Q011 2SA1048 SW
D040 RD6.8E-B1
D025 ISS119
Q015 DTC144ES SW
IC002 BA7007 SECAM
CF001 4.16MHz
DET
SECAM ACK
EC MODEL
Q806 2SC2458 BUFFER
Q620 2SA1048 AMP
IC001 BA634 FLIP FLOP
F/F
COMP
BF
Q019 2SA1048 SW
Q022 2SC2458 BUFFER
D005 ISS119
JOG PLL
SHIFT
JOG EXCHANGE
Q023 2SC2458 EQ
Q024 2SA1048 EQ
Q020 2SA1048 SW
HD
TH VCO
CF GEN
B GEN
SW CONT
INV
JUMP DET
IC003
D006 MC921
IC003 CX10023 PAL JOG
Q021 2SC2458 SW
IC020 MC14538BCP HD GEN
DL001
SECAM
D802 ISS119
Q100 DTC144WS SW
Q016 2SC2458
Q068 2SC2458 BUFFER
Q080 2SC2458 AMP
CN002 (WHT)
RF SWP
MC
CTL IN
GND
4.43M
V SEL
COMP SYNC
TO SA-9 BOARD CN038 (WHT)
V REC P
PG
CTL
Y+C
ACK
PBC
HD
COMP SYNC
4.43M

no mark: PAL REC mode
( ) :PAL PB mode
< > :SECAM REC mode
[ ] :SECAM PB mode
※ :Can not be measured

RY-4 (Y.C SIGNAL PROCESS) PRINTED WIRING BOARD

– Ref. No. RY-4 BOARD: 1,000 series –

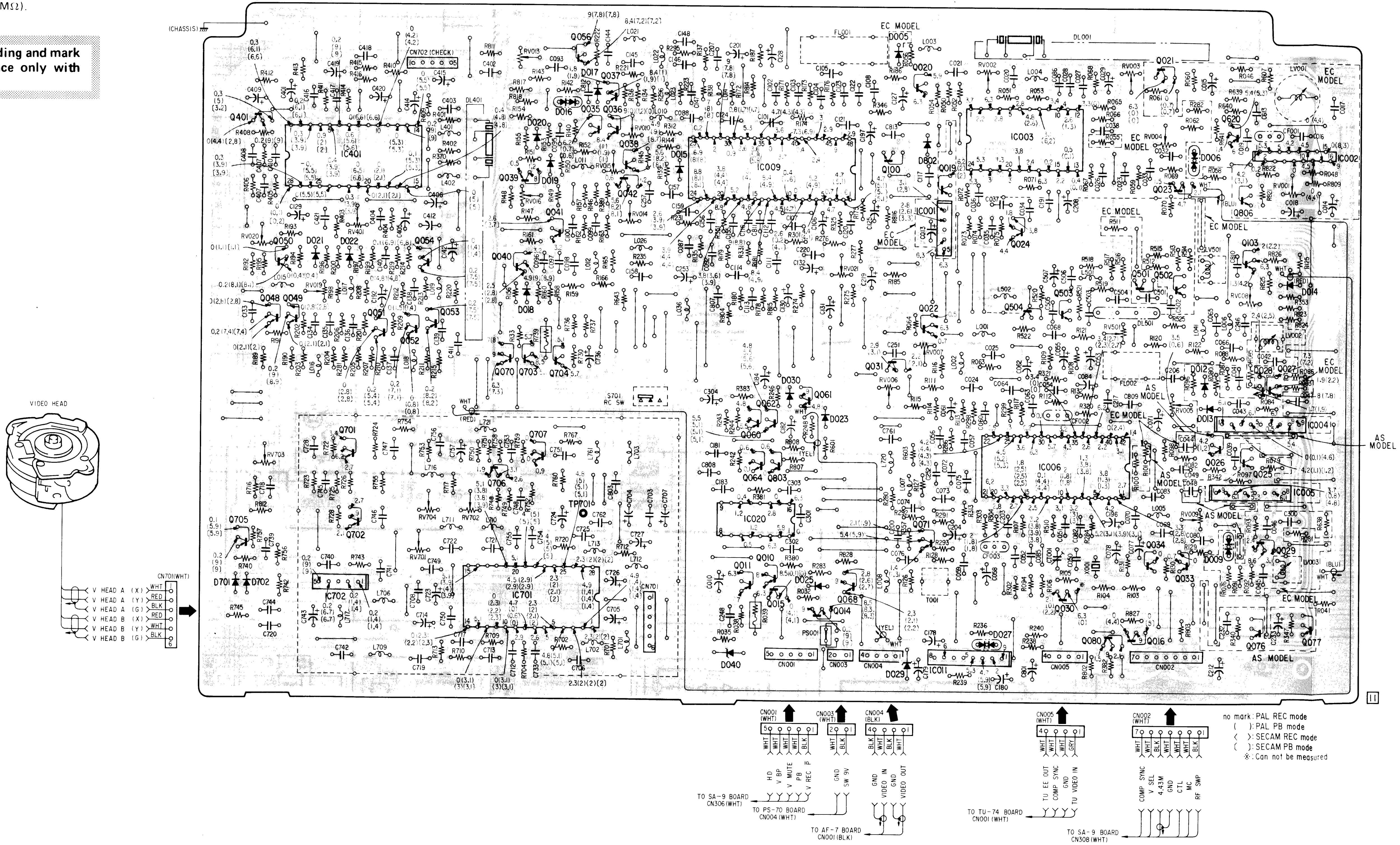
Note:

- All resistors are in ohms, 1/8 W unless otherwise noted. kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless otherwise noted. p: μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ∿ : fusible resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (10 MΩ).
- ▬ : B+ bus.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

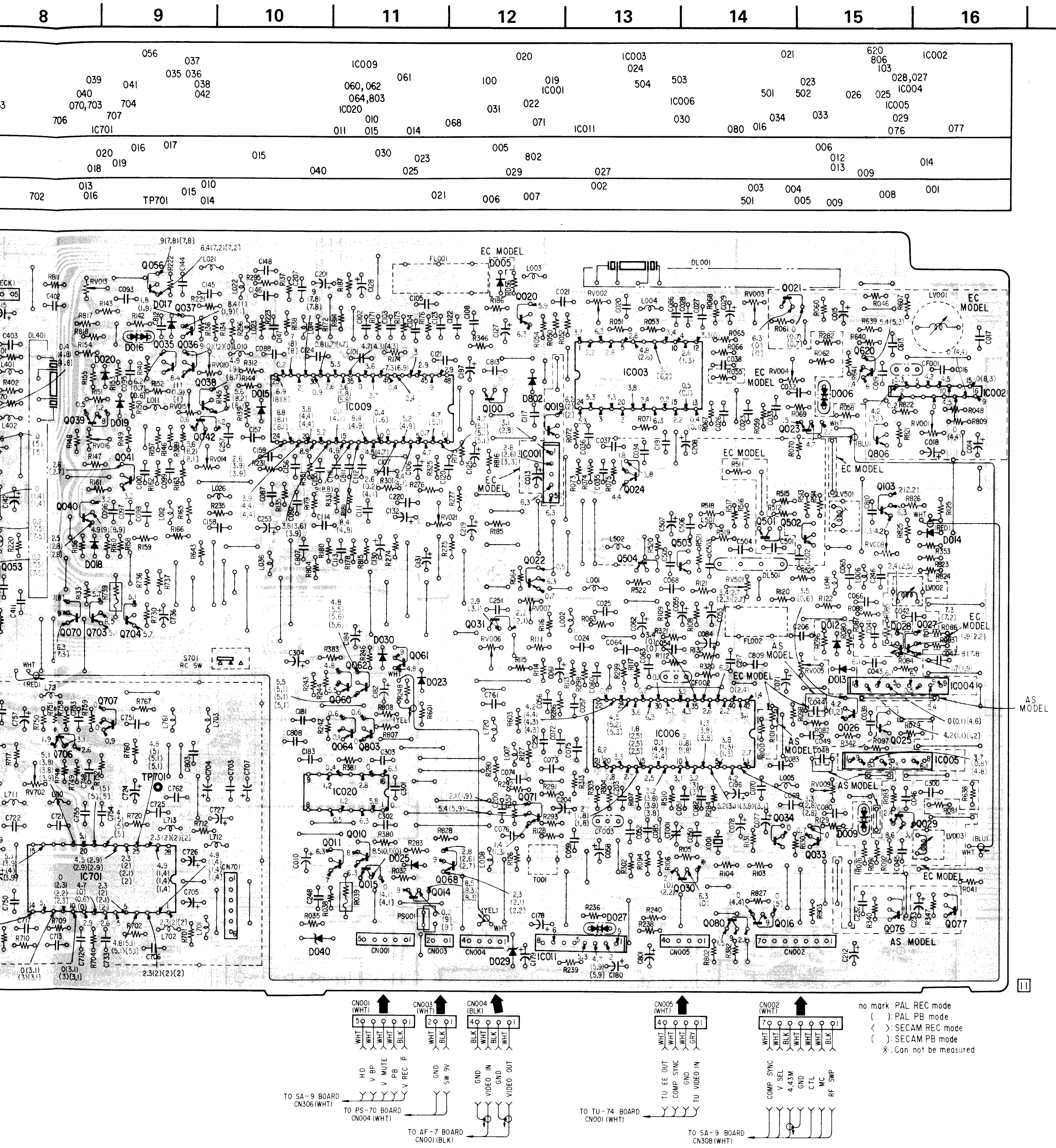
When indicating parts by reference number, please include the board name.

	6	7	8	9	10	11	12	13	14	15	16
Q · IC	401 050 048 049 705	IC401 054 051 052 701 702 IC702	039 040 053 070,703 707 706 IC701	056 037 035 036 041 038 042 704		IC009 061 060, 062 064,803 IC020 010 011 015 014	020 100 019 IC001 022 031 068 071	IC003 024 503 504 IC006 IC011	021 501 034 030 016 080	620 806 103 028,027 023 IC004 502 026 025 IC005 033 029 076	IC002 077
D	701, 702 021	022	018	017 016 020 019	015 040	030 023 025	005 802 029	027		006 012 013 009	014
ADJ · TP	020 703	019 401 701	704 702 013 016	010 015 TP701 014		021	006 007	002	003 004 501	005 009 008	001



【RY-4 BOARD】
(CHASSIS)
VIDEO HEAD
CN701(WHT)
V HEAD A (X) WHT
V HEAD A (Y) RED
V HEAD A (G) BLK
V HEAD B (X) RED
V HEAD B (Y) WHT
V HEAD B (G) BLK
CN702 (CHECK)
IC401
IC701
IC702
IC009
IC003
IC001
IC006
IC020
IC011
IC002
IC004
IC005
S701 RC SW
TP701
DL001
FL001
FL002
EC MODEL
AS MODEL
11
CN001 (WHT)
5 WHT WHT WHT WHT BLK 1
HD
V BP
V MUTE
PB
V REC P̄
TO SA-9 BOARD CN306 (WHT)
CN003 (WHT)
2 WHT BLK 1
GND
SW 9V
TO PS-70 BOARD CN004 (WHT)
CN004 (BLK)
4 BLK WHT BLK WHT 1
GND
VIDEO IN
GND
VIDEO OUT
TO AF-7 BOARD CN001 (BLK)
CN005 (WHT)
4 WHT WHT WHT GRY 1
TU EE OUT
COMP SYNC
GND
TU VIDEO IN
TO TU-74 BOARD CN001 (WHT)
CN002 (WHT)
7 WHT WHT BLK WHT WHT WHT BLK 1
COMP SYNC
V SEL
4.43M
GND
CTL
MC
RF SWP
TO SA-9 BOARD CN308 (WHT)

no mark : PAL REC mode
( ) : PAL PB mode
〈 〉 : SECAM REC mode
〔 〕 : SECAM PB mode
※ : Can not be measured


8
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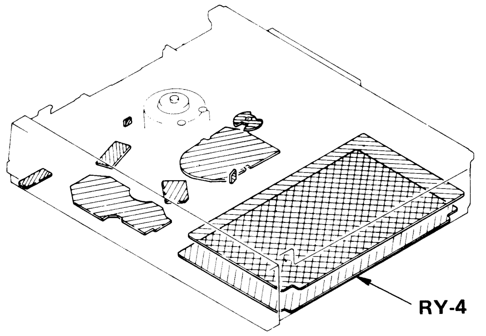
23
24
EC MODEL
AS MODEL
IC003
IC009
IC006
IC020
IC701
IC004
IC005
IC002
IC001
CN001 (WHT)
HD
V BP
V MUTE
PB
V REC
TO SA-9 BOARD CN306(WHT)
CN003 (WHT)
GND
SW 9V
TO PS-70 BOARD CN004 (WHT)
CN004 (BLK)
GND
VIDEO IN
GND
VIDEO OUT
TO AF-7 BOARD CN001 (BLK)
CN005 (WHT)
TU EE OUT
COMP SYNC
GND
TU VIDEO IN
TO TU-74 BOARD CN001 (WHT)
CN002 (WHT)
COMP SYNC
V SEL
4.43M
GND
CTL
MC
RF SWP
TO SA-9 BOARD CN308 (WHT)

no mark: PAL REC mode
( ): PAL PB mode
⟨ ⟩: SECAM REC mode
〔 〕: SECAM PB mode
※: Can not be measured

Note:

- ○—— : Indicates a leadwire mounted on the component side.
- ●—— : Indicates a leadwire mounted on the printed side.
- ▨ : soldering side.
- : B+ pattern

When indicating parts by reference number, please include the board name.



4-3. SA-9 (SYSTEM CONTROL, SERVO, AUDIO), RD-20 (ROTATION DETECTOR), RD-21 (ROTATION DETECTOR), LM-8 (LOADING MOTOR) SCHEMATIC DIAGRAMS

– Ref. No. SA-9 BOARD: 2,000 series, RD-20 BOARD: 4,000 series, RD-21 BOARD: 4,000 series, LM-8 BOARD: 7,100 series –

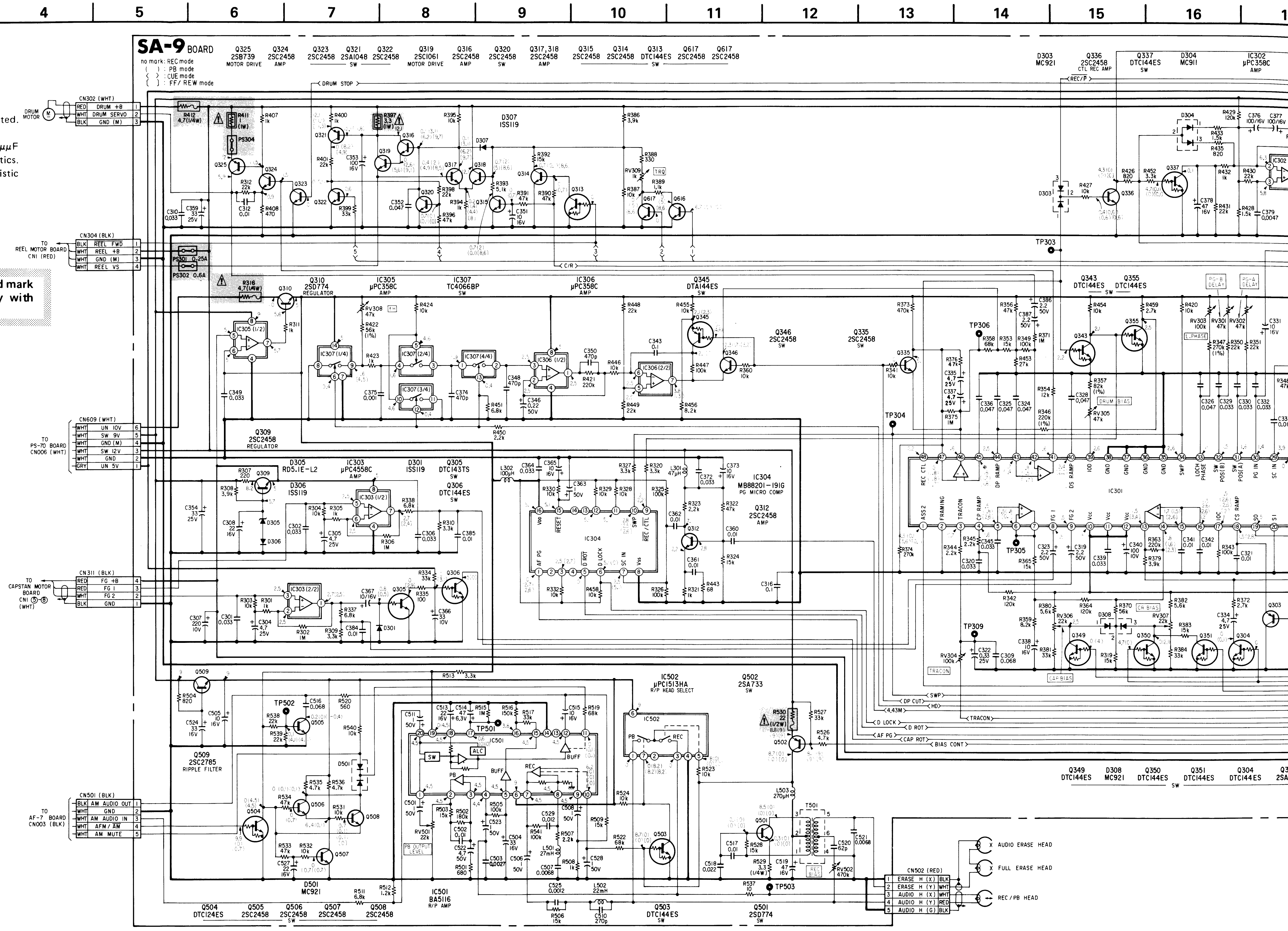
Note:

- All resistors are in ohms, 1/6 W unless otherwise noted. kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless otherwise noted. p: μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (10 MΩ).
- ▬ : B+ bus.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

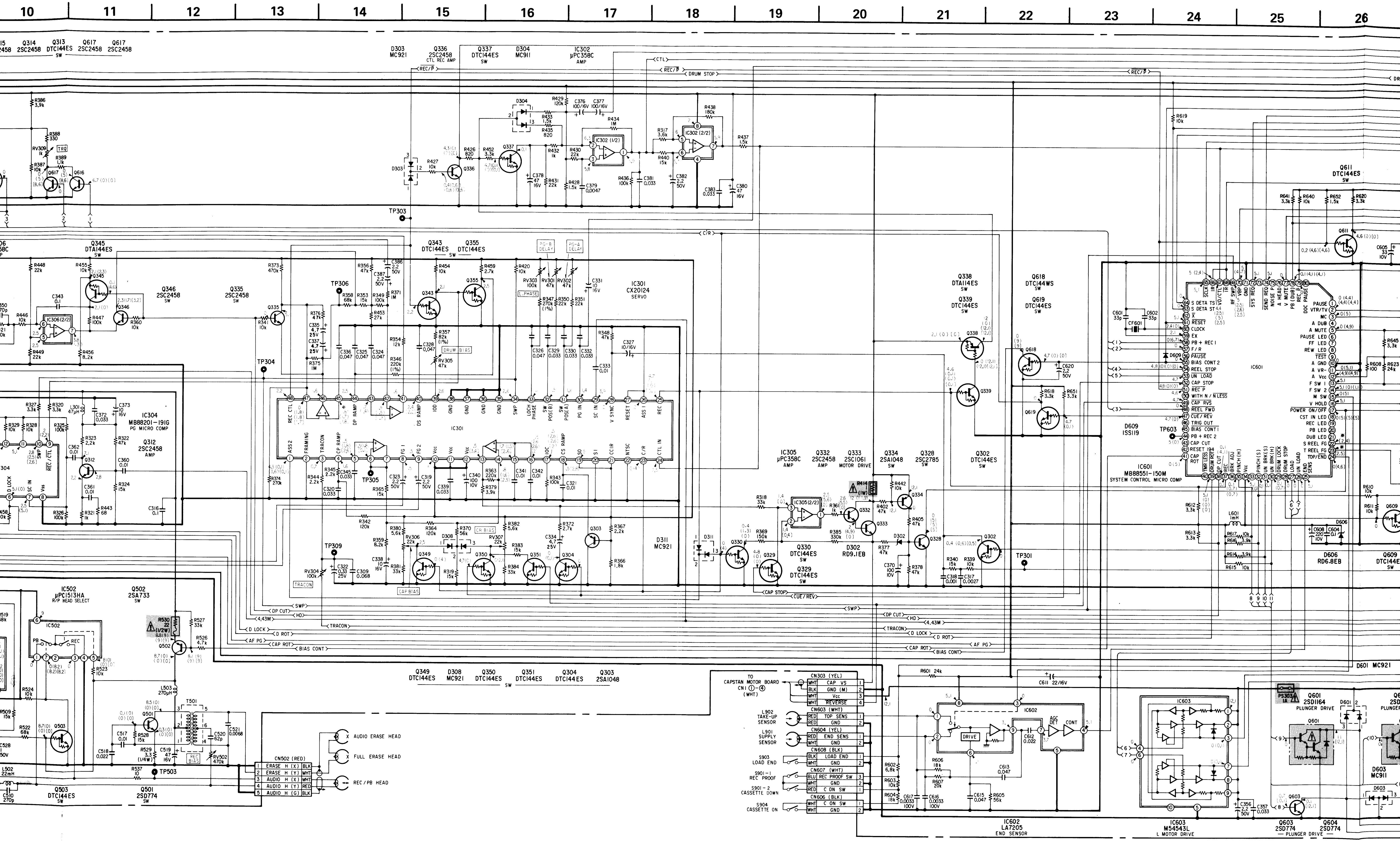
- **Signal path**

When indicating parts by reference number, please include the board name.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J
SA-9 BOARD
no mark: REC mode
( ) : PB mode
< > : CUE mode
[ ] : FF/REW mode
Q325 2SB739 MOTOR DRIVE
Q324 2SC2458 AMP
Q323 2SC2458
Q321 2SA1048
Q322 2SC2458 SW
Q319 2SC1061 MOTOR DRIVE
Q316 2SC2458 AMP
Q320 2SC2458 SW
Q317,318 2SC2458 AMP
Q315 2SC2458
Q314 2SC2458
Q313 DTC144ES SW
Q617 2SC2458
Q617 2SC2458
D303 MC921
Q336 2SC2458 CTL REC AMP
Q337 DTC144ES SW
D304 MC911
IC302 μPC358C AMP
DRUM MOTOR
CN302 (WHT)
RED DRUM +B
WHT DRUM SERVO
BLK GND (M)
TO REEL MOTOR BOARD CN1 (RED)
CN304 (BLK)
BLK REEL FWD
WHT REEL +B
WHT GND (M)
WHT REEL VS
DRUM STOP
REC/P
C/R
TP303
PS301 0.25A
PS302 0.6A
PS304
R412 4.7(1/4W)
R316 4.7(1/4W)
Q310 2SD774 REGULATOR
IC305 μPC358C AMP
IC307 TC4066BP SW
IC306 μPC358C AMP
Q345 DTA144ES SW
Q343 DTC144ES
Q355 DTC144ES SW
Q346 2SC2458 SW
Q335 2SC2458 SW
TP306
TP304
RV308 47k
RV309 1k
RV301 47k
RV302 47k
RV303 100k
RV305 47k
DRUM BIAS
L.PHASE
PG-B DELAY
PG-A DELAY
TO PS-70 BOARD CN006 (WHT)
CN609 (WHT)
WHT UN 10V
WHT SW 9V
WHT GND (M)
WHT SW 12V
WHT GND
GRY UN 5V
Q309 2SC2458 REGULATOR
D305 RD5.1E-L2
IC303 μPC4558C AMP
D301 1SS119
Q305 DTC143TS SW
Q306 DTC144ES SW
D306 1SS119
D307 1SS119
L302 100μH
IC304 MB88201-191G PG MICRO COMP
Q312 2SC2458 AMP
IC301
REC CTL
DP RAMP
DS RAMP
GND
SWP
LOCH PHASE
SW POS(B)
SW POS(A)
PG IN
SC IN
PASS 2
FRAMING
TRACON
CP RAMP
FG 1
FG 2
Vcc
CS RAMP
TP305
TO CAPSTAN MOTOR BOARD CN1 5-8 (WHT)
CN311 (BLK)
RED FG +B
RED FG 1
WHT FG 2
BLK GND
TP309
RV304 100k
TRACON
RV306 22k
RV307 22k
CR BIAS
CAP BIAS
D308
Q349
Q350
Q351
Q304
Q303
SWP
DP CUT
HD
4.43M
D LOCK
TRACON
D ROT
AF PG
CAP ROT
BIAS CONT
Q349 DTC144ES
D308 MC921
Q350 DTC144ES
Q351 DTC144ES
Q304 DTC144ES SW
Q509 2SC2785 RIPPLE FILTER
TP502
IC502 μPC1513HA R/P HEAD SELECT
Q502 2SA733 SW
R513 3.3k
TP501
ALC
SW
PB
BUFF
REC
R530 22 (1/2W)
RV501 22k
PB OUTPUT LEVEL
TO AF-7 BOARD CN003 (BLK)
CN501 (BLK)
BLK AM AUDIO OUT
WHT GND
WHT AM AUDIO IN
WHT AFM/AM
WHT AM MUTE
L503 270μH
T501
REC BIAS
RV502 470k
AUDIO ERASE HEAD
FULL ERASE HEAD
REC/PB HEAD
CN502 (RED)
1 ERASE H (X) BLK
2 ERASE H (Y) WHT
3 AUDIO H (X) WHT
4 AUDIO H (Y) RED
5 AUDIO H (G) BLK
TP503
IC501 BA5116 R/P AMP
D501 MC921
Q504 DTC124ES
Q505 2SC2458
Q506 2SC2458
Q507 2SC2458
Q508 2SC2458 SW
Q503 DTC144ES SW
Q501 2SD774 SW

SERVO, SYSTEM CONTROL, AUDIO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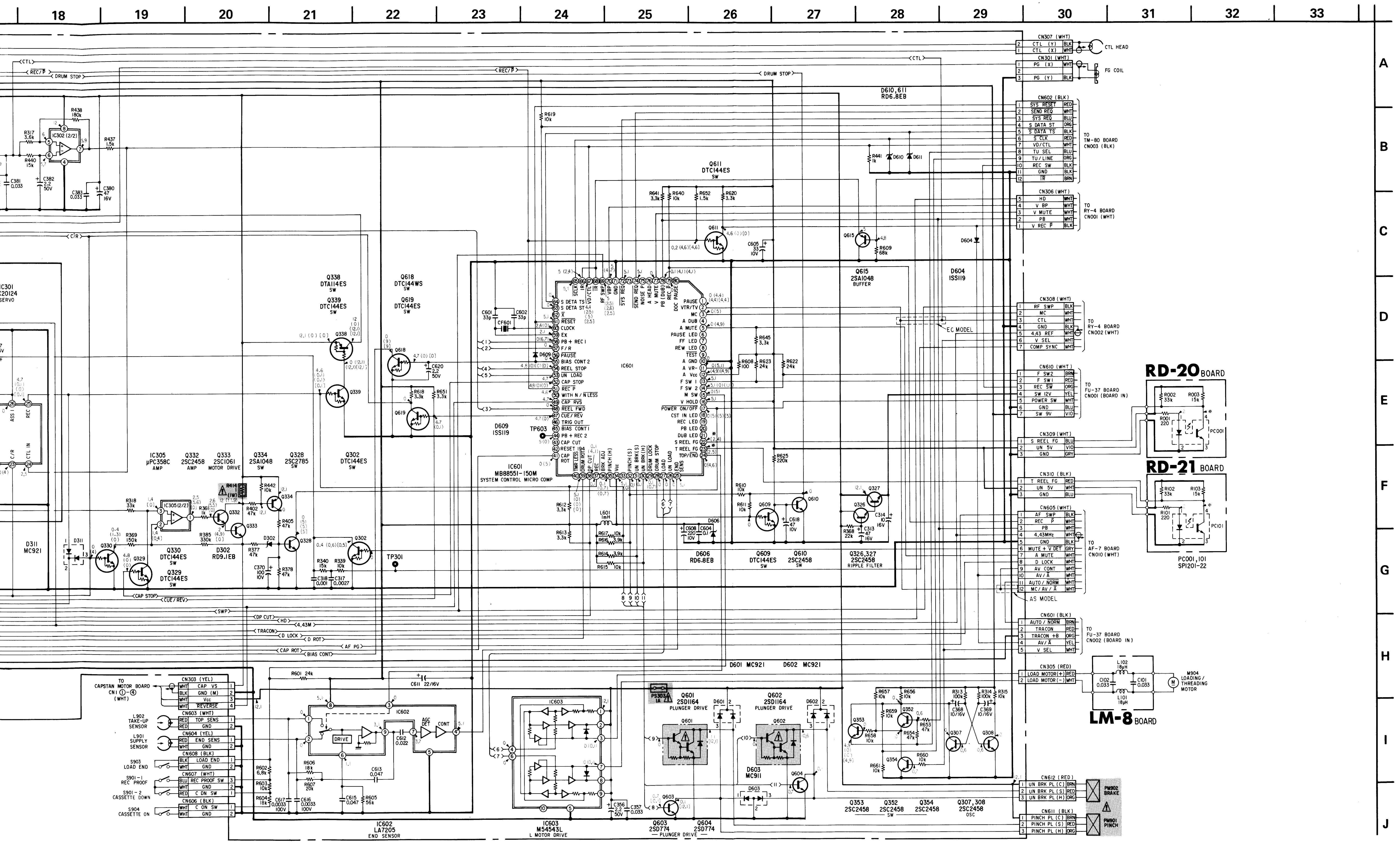
IC301
CX20124
SERVO
IC302
μPC358C
AMP
IC304
MB88201-191G
PG MICRO COMP
IC305
μPC358C
AMP
IC306 (2/2)
IC502
μPC1513HA
R/P HEAD SELECT
IC601
MB88551-150M
SYSTEM CONTROL MICRO COMP
IC602
LA7205
END SENSOR
IC603
M54543L
L MOTOR DRIVE
Q335
2SC2458
Q336
2SC2458
CTL REC AMP
Q337
DTC144ES
SW
Q343
DTC144ES
Q355
DTC144ES
SW
Q345
DTA144ES
SW
Q346
2SC2458
SW
Q312
2SC2458
AMP
Q332
2SC2458
AMP
Q333
2SC1061
MOTOR DRIVE
Q334
2SA1048
SW
Q328
2SC2785
SW
Q302
DTC144ES
SW
Q338
DTA114ES
SW
Q339
DTC144ES
SW
Q618
DTC144WS
SW
Q619
DTC144ES
SW
Q611
DTC144ES
SW
Q330
DTC144ES
SW
Q329
DTC144ES
SW
Q502
2SA733
SW
Q501
2SD774
Q503
DTC144ES
SW
Q601
2SD1164
PLUNGER DRIVE
Q603
2SD774
Q604
2SD774
PLUNGER DRIVE
Q609
DTC144E
SW
Q349
DTC144ES
D308
MC921
Q350
DTC144ES
Q351
DTC144ES
Q304
DTC144ES
Q303
2SA1048
SW
D303
MC921
D304
MC911
D311
MC921
D302
RD9.1EB
D609
1SS119
D606
RD6.8EB
D601
MC921
D603
MC911
TP301
TP303
TP304
TP305
TP306
TP309
TP503
TP603
PS303 1A
PS601 1A
R414 5.6 (1W)
R530 22 (1/2W)
CN303 (YEL)
CN603 (WHT)
CN604 (YEL)
CN608 (BLK)
CN607 (WHT)
CN606 (BLK)
CN502 (RED)
TO CAPSTAN MOTOR BOARD CN1 ①-④ (WHT)
L902 TAKE-UP SENSOR
L901 SUPPLY SENSOR
S903 LOAD END
S901-1 REC PROOF
S901-2 CASSETTE DOWN
S904 CASSETTE ON
AUDIO ERASE HEAD
FULL ERASE HEAD
REC/PB HEAD
ERASE H (X)
ERASE H (Y)
AUDIO H (X)
AUDIO H (Y)
AUDIO H (G)
CTL
REC/P
DRUM STOP
C/R
CAP STOP
CUE/REV
SWP
DP CUT
HD
4.43M
TRACON
D LOCK
D ROT
AF PG
CAP ROT
BIAS CONT
DRUM BIAS
CR BIAS
CAP BIAS
PG-B DELAY
PG-A DELAY
L.PHASE
REC BIAS
T501
L503 270μH
L502 22mH
L601 1mH
RV303
RV301
RV302
RV304
RV305
RV306
RV307
RV309
RV502 470k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32
33
A
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C
D
E
F
G
H
I
J
IC601
MB88551-150M
SYSTEM CONTROL MICRO COMP
IC602
LA7205
END SENSOR
IC603
M54543L
L MOTOR DRIVE
IC305
μPC358C
AMP
Q332
2SC2458
AMP
Q333
2SC1061
MOTOR DRIVE
Q334
2SA1048
SW
Q328
2SC2785
SW
Q302
DTC144ES
SW
Q338
DTA114ES
SW
Q339
DTC144ES
SW
Q618
DTC144WS
SW
Q619
DTC144ES
SW
Q611
DTC144ES
SW
Q615
2SA1048
BUFFER
D610, 611
RD6.8EB
D604
1SS119
D609
1SS119
TP603
TP301
D311
MC921
Q330
DTC144ES
SW
Q329
DTC144ES
SW
D302
RD9.1EB
D606
RD6.8EB
Q609
DTC144ES
SW
Q610
2SC2458
SW
Q326, 327
2SC2458
RIPPLE FILTER
D601 MC921
D602 MC921
Q601
2SD1164
PLUNGER DRIVE
Q602
2SD1164
PLUNGER DRIVE
D603
MC911
Q603
2SD774
Q604
2SD774
PLUNGER DRIVE
Q353
2SC2458
Q352
2SC2458
Q354
2SC2458
SW
Q307, 308
2SC2458
OSC
CN307 (WHT)
CTL HEAD
CN301 (WHT)
FG COIL
CN602 (BLK)
TO TM-80 BOARD CN003 (BLK)
CN306 (WHT)
TO RY-4 BOARD CN001 (WHT)
CN308 (WHT)
TO RY-4 BOARD CN002 (WHT)
CN610 (WHT)
TO FU-37 BOARD CN001 (BOARD IN)
CN309 (WHT)
CN310 (BLK)
CN605 (WHT)
TO AF-7 BOARD CN010 (WHT)
AS MODEL
EC MODEL
CN601 (BLK)
TO FU-37 BOARD CN002 (BOARD IN)
CN305 (RED)
M904
LOADING / THREADING MOTOR
LM-8 BOARD
RD-20 BOARD
RD-21 BOARD
PC001, 101
SPI201-22
CN612 (RED)
PM902
BRAKE
CN611 (BLK)
PM901
PINCH
TO CAPSTAN MOTOR BOARD CN1 ①-④ (WHT)
CN303 (YEL)
L902
TAKE-UP SENSOR
L901
SUPPLY SENSOR
S903
LOAD END
S901-1
REC PROOF
S901-2
CASSETTE DOWN
S904
CASSETTE ON
CN603 (WHT)
CN604 (YEL)
CN608 (BLK)
CN607 (WHT)
CN606 (BLK)
IC301
IC302 (2/2)
IC305 (2/2)
PS303
1A
R414
(1W)

REEL MOTOR, CAPSTAN MOTOR SCHEMATIC DIAGRAMS

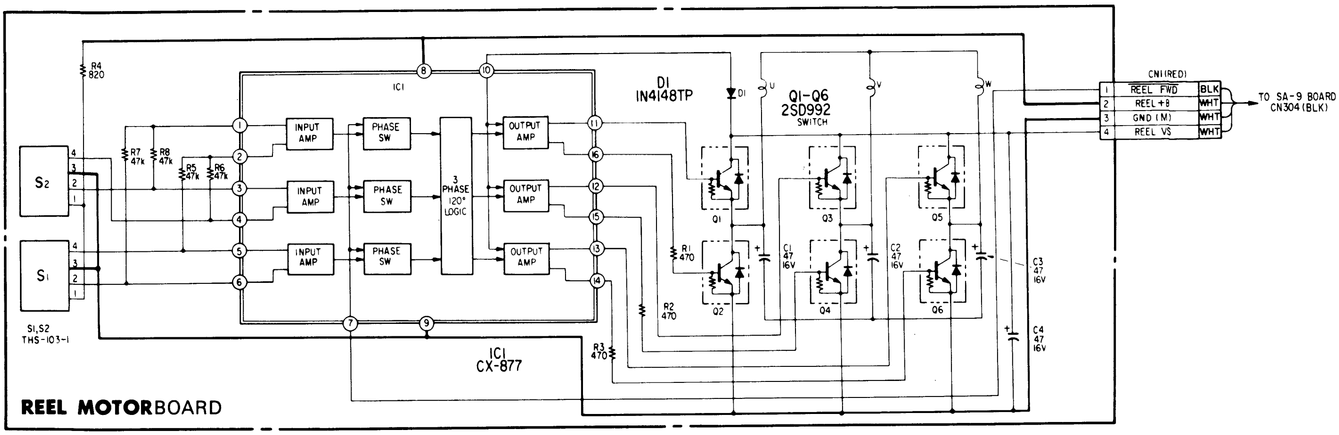
– Ref. No. REEL MOTOR BOARD: 9,100 series, CAPSTAN MOTOR BOARD: 9,200 series –

1 2 3 4 5 6 7

A

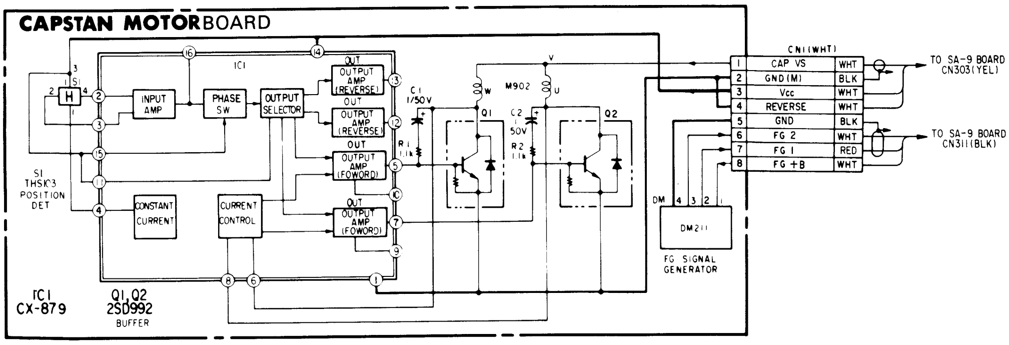
B

C


R4
820
IC1
D1
IN4148TP
D1
U
V
W
Q1-Q6
2SD992
SWITCH
CN1(RED)
1 REEL FWD BLK
2 REEL +B WHT
3 GND (M) WHT
4 REEL VS WHT
TO SA-9 BOARD
CN304(BLK)
S2
S1
R7
47k
R8
47k
R5
47k
R6
47k
INPUT AMP
PHASE SW
3 PHASE 120° LOGIC
OUTPUT AMP
Q1
Q2
Q3
Q4
Q5
Q6
R1
470
R2
470
R3
470
C1
47
16V
C2
47
16V
C3
47
16V
C4
47
16V
S1,S2
THS-103-1
IC1
CX-877
REEL MOTORBOARD

D

E


CAPSTAN MOTORBOARD
IC1
S1
H
INPUT AMP
PHASE SW
OUTPUT SELECTOR
OUT
OUTPUT AMP (REVERSE)
OUTPUT AMP (FOWORD)
CONSTANT CURRENT
CURRENT CONTROL
S1
THS103
POSITION DET
C1
1/50V
R1
1.1k
C2
1
50V
R2
1.1k
M902
W
U
V
Q1
Q2
CN1(WHT)
1 CAP VS WHT
2 GND(M) BLK
3 Vcc WHT
4 REVERSE WHT
5 GND BLK
6 FG 2 WHT
7 FG 1 RED
8 FG +B WHT
TO SA-9 BOARD
CN303(YEL)
TO SA-9 BOARD
CN311(BLK)
DM
DM211
FG SIGNAL GENERATOR
IC1
CX-879
Q1,Q2
2SD992
BUFFER

F

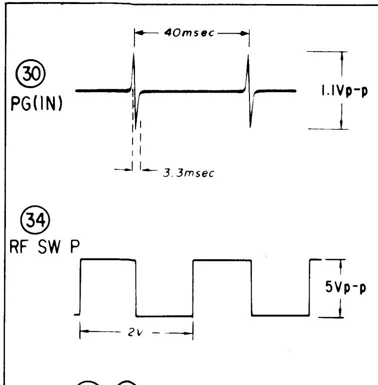
G

H

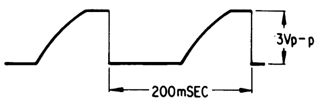
I

SERVO, SYSTEM CONTROL, AUDIO

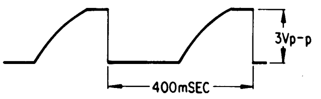
SA-9 BOARD


40msec
㉚
PG(IN)
1.1Vp-p
3.3msec
㉞
RF SW P
5Vp-p
2v

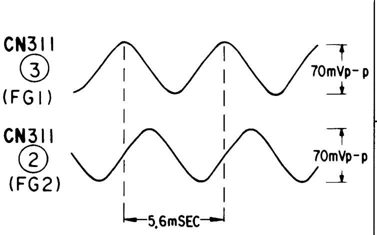
IC301 ㉚ ㉞ REC/PB


3Vp-p
200mSEC

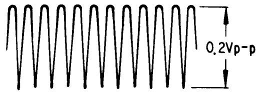
IC301 ③ REC


3Vp-p
400mSEC

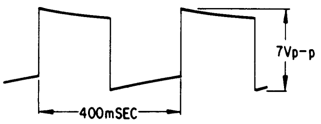
IC301 ㉝ REC


CN311
③
(FG1)
70mVp-p
CN311
②
(FG2)
70mVp-p
5.6mSEC

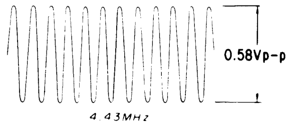
REC/PB



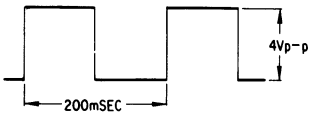
IC301 ㉞ TP304


7Vp-p
400mSEC

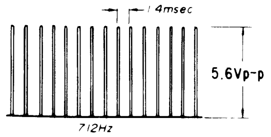
IC302 ③ REC


0.58Vp-p
4.43MHz

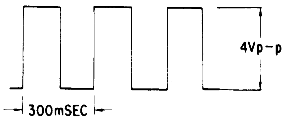
IC301 ㉙ REC/PB


4Vp-p
200mSEC

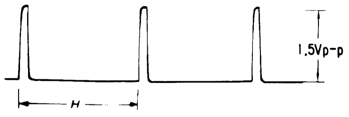
IC302 ①⑤⑦ REC


1.4msec
5.6Vp-p
712Hz

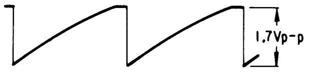
IC301 ⑲ REC/PB


4Vp-p
300mSEC

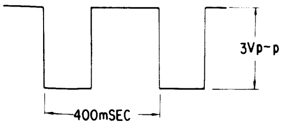
IC304 ⑨ REC



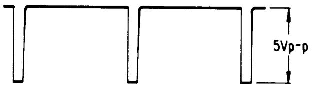
IC301 ㉘ REC V SYNC



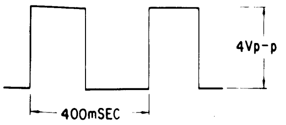
IC307① REC/PB


3Vp-p
400mSEC

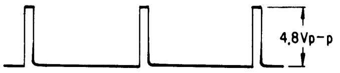
IC301 ㉛ ㉜ REC/PB



IC307 ⑤ REC/PB


4Vp-p
400mSEC

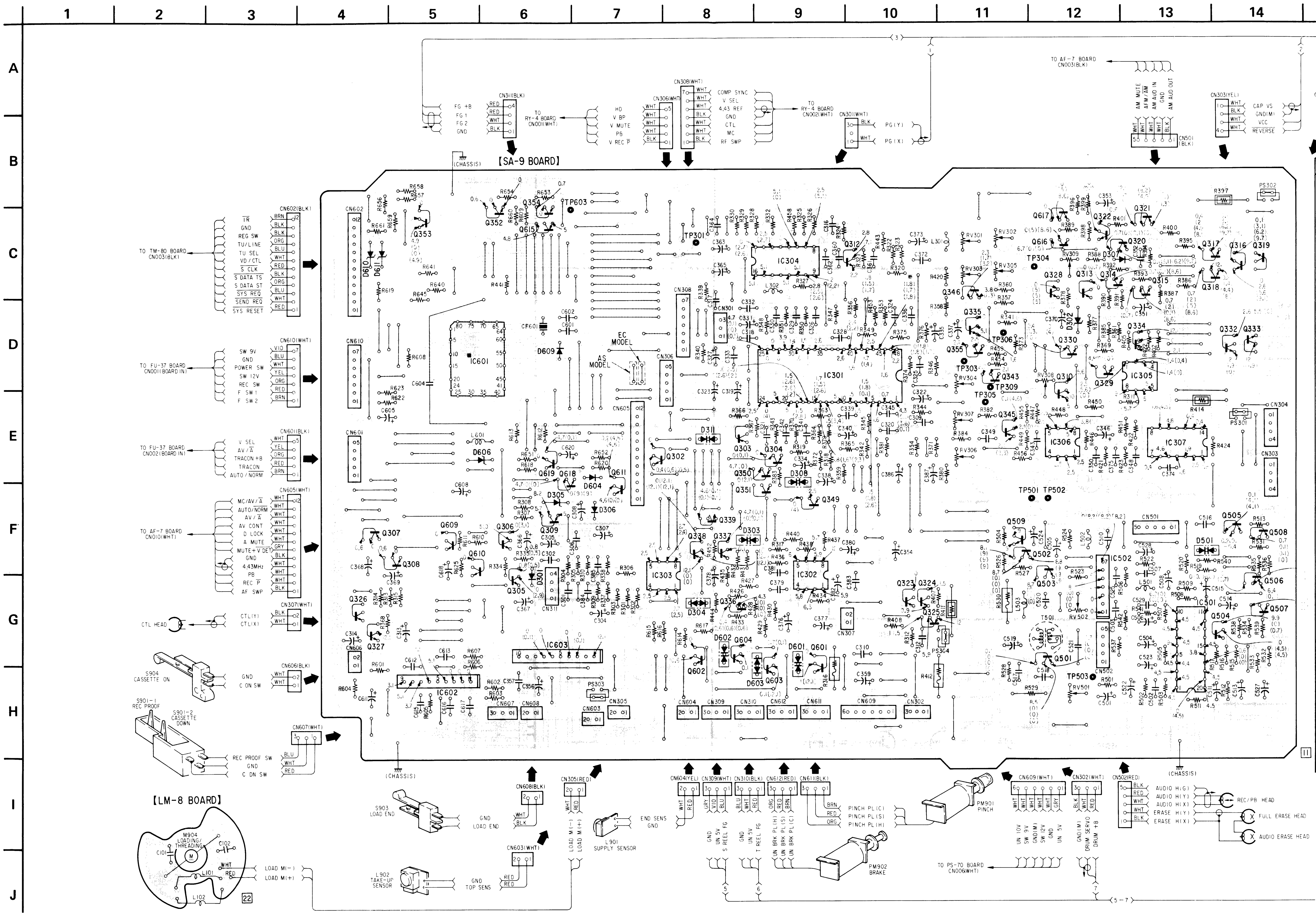
IC301 ㊽ REC



IC601 ② REC/PB

SA-9 (SYSTEM CONTROL, SERVO, AUDIO), RD-20 (ROTATION DETECTOR), RD-21 (ROTATION DETECTOR), LM-8 (LOADING MOTOR), REEL MOTOR, CAPSTAN MOTOR PRINTED WIRING BOARDS

– Ref. No. SA-9 BOARD: 2,000 series, RD-20 BOARD: 4,000 series, RD-21 BOARD: 4,000 series, LM-8 BOARD: 7,100 series, REEL MOTOR BOARD: 9,100 series, CAPSTAN MOTOR BOARD: 9,200 series –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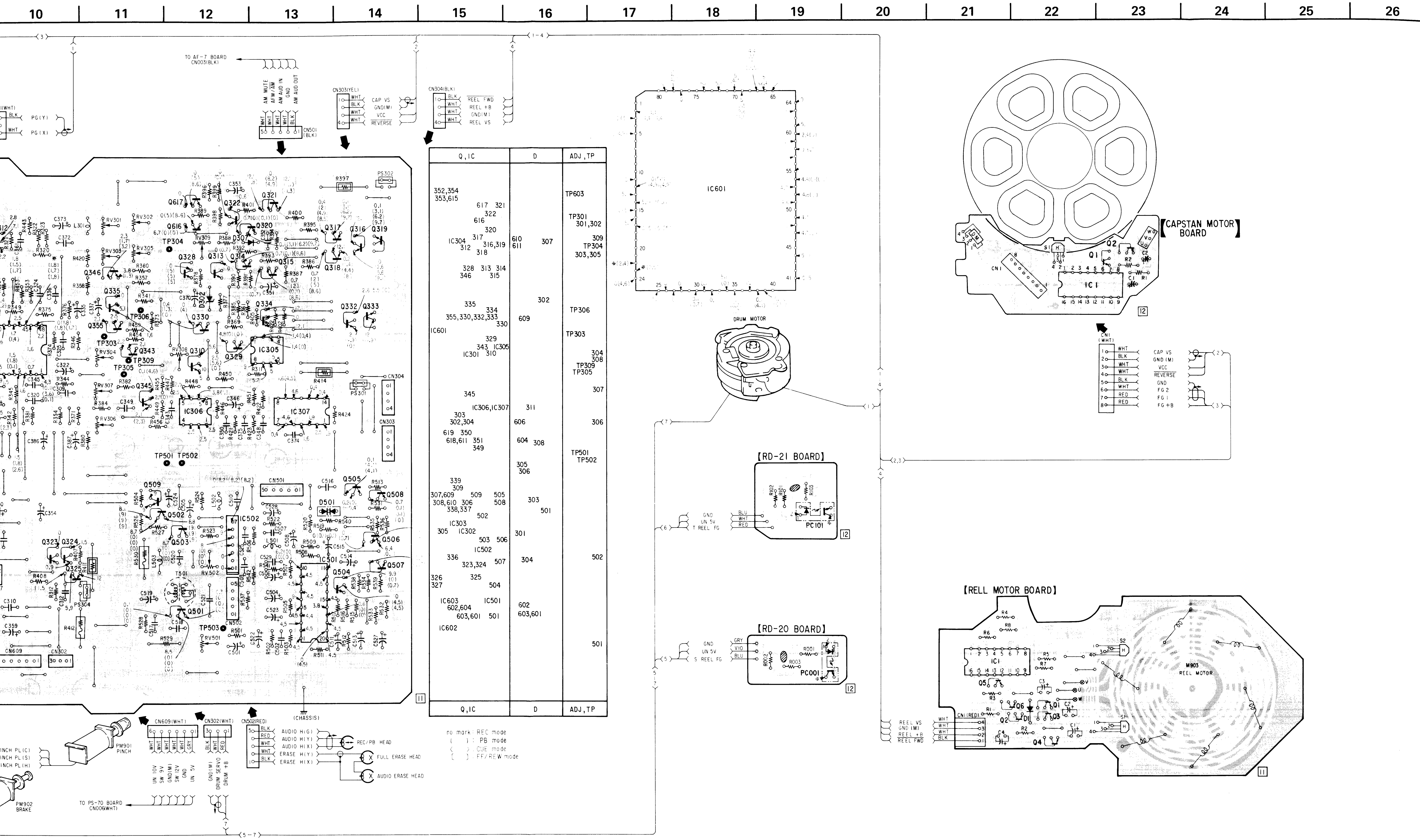
A
B
C
D
E
F
G
H
I
J
[SA-9 BOARD]
[LM-8 BOARD]
TO TM-80 BOARD CN003(BLK)
CN602(BLK)
TR
GND
REG SW
TU/LINE
TU SEL
VD/CTL
S CLK
S DATA TS
S DATA ST
SYS REQ
SEND REQ
SYS RESET
TO FU-37 BOARD CN001(BOARD IN)
CN610(WHT)
SW 9V
GND
POWER SW
SW 12V
REC SW
F SW 1
F SW 2
TO FU-37 BOARD CN002(BOARD IN)
CN601(BLK)
V SEL
AV/A
TRACON +B
TRACON
AUTO/NORM
TO AF-7 BOARD CN010(WHT)
CN605(WHT)
MC/AV/A
AUTO/NORM
AV/A
AV CONT
D LOCK
A MUTE
MUTE+V DET
GND
4.43MHz
PB
REC P
AF SWP
CN307(WHT)
CTL HEAD
CTL(Y)
CTL(X)
CN606(BLK)
S904 CASSETTE ON
GND
C ON SW
S901-1 REC PROOF
S901-2 CASSETTE DOWN
CN607(WHT)
REC PROOF SW
GND
C ON SW
M904 LOADING/THREADING
C101
C102
L101
L102
LOAD M(-)
LOAD M(+)
CN311(BLK)
FG +B
FG 1
FG 2
GND
TO RY-4 BOARD CN001(WHT)
CN306(WHT)
HD
V BP
V MUTE
PB
V REC P
CN308(WHT)
COMP SYNC
V SEL
4.43 REF
GND
CTL
MC
RF SWP
TO RY-4 BOARD CN002(WHT)
CN301(WHT)
PG(Y)
PG(X)
TO AF-7 BOARD CN003(BLK)
AM MUTE
AFM/AM
AM AUD IN
GND
AM AUD OUT
CN501(BLK)
CN303(YEL)
CAP VS
GND(M)
VCC
REVERSE
CN304(BLK)
REEL FWD
REEL +B
GND(M)
REEL VS
(CHASSIS)
IC601
IC602
IC603
IC301
IC302
IC303
IC304
IC305
IC306
IC307
IC501
IC502
EC MODEL
AS MODEL
TP301
TP303
TP304
TP305
TP306
TP309
TP501
TP502
TP503
TP603
S903 LOAD END
CN608(BLK)
GND
LOAD END
L902 TAKE-UP SENSOR
CN603(WHT)
GND
TOP SENS
CN305(RED)
LOAD M(-)
LOAD M(+)
L901 SUPPLY SENSOR
END SENS
GND
CN604(YEL)
CN309(WHT)
CN310(BLK)
CN612(RED)
CN611(BLK)
GND
UN 5V
S REEL FG
GND
UN 5V
T REEL FG
UN BRK PL(S)
UN BRK PL(C)
PINCH PL(C)
PINCH PL(S)
PINCH PL(H)
PM902 BRAKE
PM901 PINCH
CN609(WHT)
UN 10V
SW 9V
GND(M)
SW 12V
GND
UN 5V
TO PS-70 BOARD CN006(WHT)
CN302(WHT)
GND(M)
DRUM SERVO
DRUM +B
CN502(RED)
AUDIO H(G)
AUDIO H(Y)
AUDIO H(X)
ERASE H(Y)
ERASE H(X)
REC/PB HEAD
FULL ERASE HEAD
AUDIO ERASE HEAD
11
22

Q,IC	D	ADJ,TP
352,354 353,615		TP603
617 321 322 616 320		TP301 301,302
IC304 317 312 316,319 318	610 611 307	309 TP304 303,305
328 313 314 346 315		
335 334 355,330,332,333 330	302 609	TP306
IC601 329 343 IC305 IC301 310		TP303 304 308 TP309 TP305
345		307
IC306,IC307 303 302,304	311 606	306
619 350 618,611 351 349	604 308	TP501 TP502
	305 306	
339 309 307,609 509 505 308,610 306 508 338,337 502	303 501	
IC303 305 IC302 503 506 IC502	301	
336 323,324 507	304	502
326 325 327 504		
IC603 IC501 602,604 603,601 501	602 603,601	
IC602		501
Q,IC	D	ADJ,TP

no mark : REC mode
( ) : PB mode
〈 〉 : CUE mode
[ ] : FF/REW mode

L MOTOR, CAPSTAN MOTOR PRINTED WIRING BOARDS

0 series, CAPSTAN MOTOR BOARD: 9,200 series –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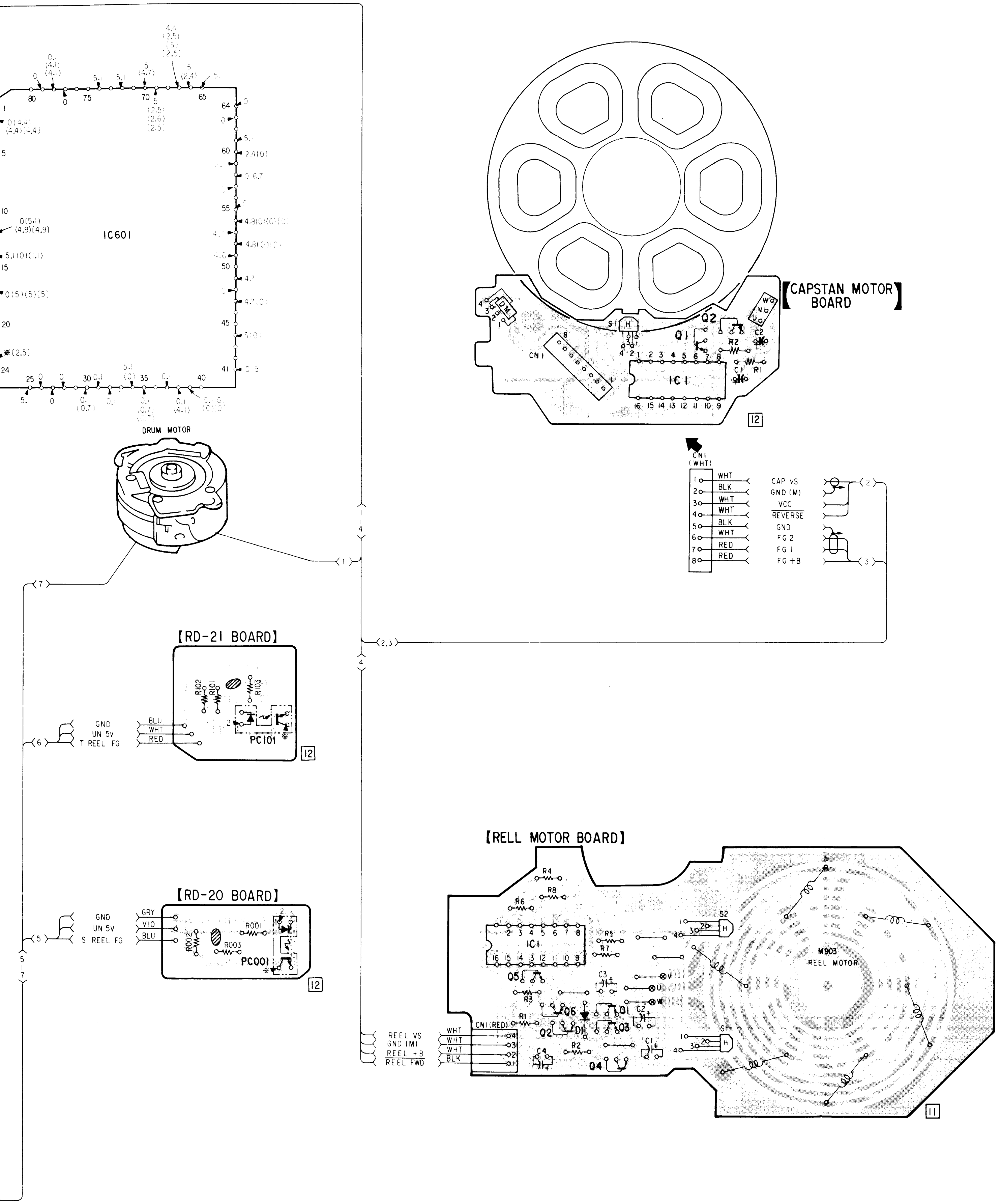
TO AF-7 BOARD CN003(BLK)
AM MUTE
AFM/AM
AM AUD IN
GND
AM AUD OUT
CN501 (BLK)
CN303(YEL)
CAP VS
GND(M)
VCC
REVERSE
CN304(BLK)
REEL FWD
REEL +B
GND(M)
REEL VS
PG(Y)
PG(X)
Q,IC
D
ADJ,TP
IC601
DRUM MOTOR
CAPSTAN MOTOR BOARD
CN1 (WHT)
CAP VS
GND (M)
VCC
REVERSE
GND
FG 2
FG 1
FG +B
IC305
IC306
IC307
IC501
IC502
TP501 TP502
[RD-21 BOARD]
GND
UN 5V
T REEL FG
PC101
[RD-20 BOARD]
S REEL FG
PC001
[RELL MOTOR BOARD]
M903
REEL MOTOR
REEL VS
GND (M)
REEL +B
REEL FWD
CN609(WHT)
CN302(WHT)
CN502(RED)
(CHASSIS)
AUDIO H(G)
AUDIO H(Y)
AUDIO H(X)
ERASE H(Y)
ERASE H(X)
REC/PB HEAD
FULL ERASE HEAD
AUDIO ERASE HEAD
PINCH PL(C)
PINCH PL(S)
PINCH PL(H)
PM901 PINCH
PM902 BRAKE
UN 10V
SW 9V
SW 12V
GND
UN 5V
GND(M)
DRUM SERVO
DRUM +B
TO PS-70 BOARD CN006(WHT)

no mark : REC mode
( ) : PB mode
< > : CUE mode
[ ] : FF/REW mode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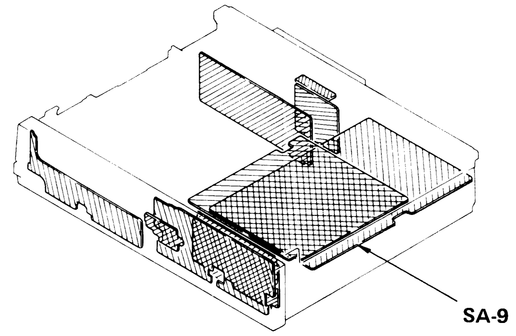
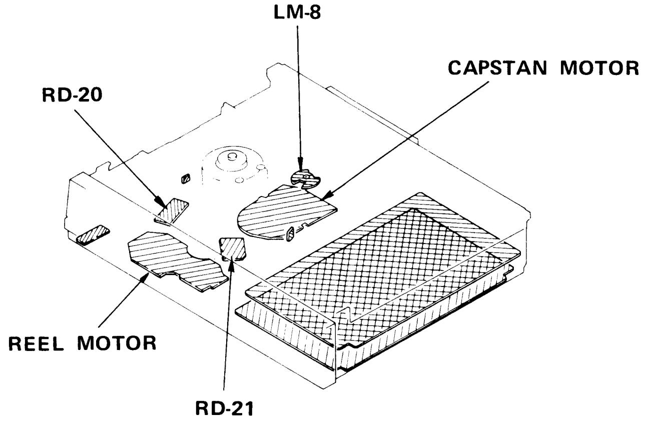
H
I
IC601
DRUM MOTOR
【CAPSTAN MOTOR BOARD】
S1
H
Q1
Q2
R2
C2
IC1
C1
R1
CN1
12
CN1 (WHT)
1 WHT CAP VS
2 BLK GND (M)
3 WHT VCC
4 WHT REVERSE
5 BLK GND
6 WHT FG 2
7 RED FG 1
8 RED FG +B
【RD-21 BOARD】
GND
UN 5V
T REEL FG
BLU
WHT
RED
R102
R101
R103
PC101
12
【RD-20 BOARD】
GND
UN 5V
S REEL FG
GRY
VIO
BLU
R002
R001
R003
PC001
12
【RELL MOTOR BOARD】
R4
R6
R8
R5
R7
IC1
S2
Q5
R3
R1
Q6
Q1
D1
Q3
C2
C3
Q2
R2
C1
Q4
C4
S1
CN1 (RED)
M903
REEL MOTOR
REEL VS
GND (M)
REEL +B
REEL FWD
WHT
WHT
WHT
BLK
11

When indicating parts by reference number, please include the board name.

Note:

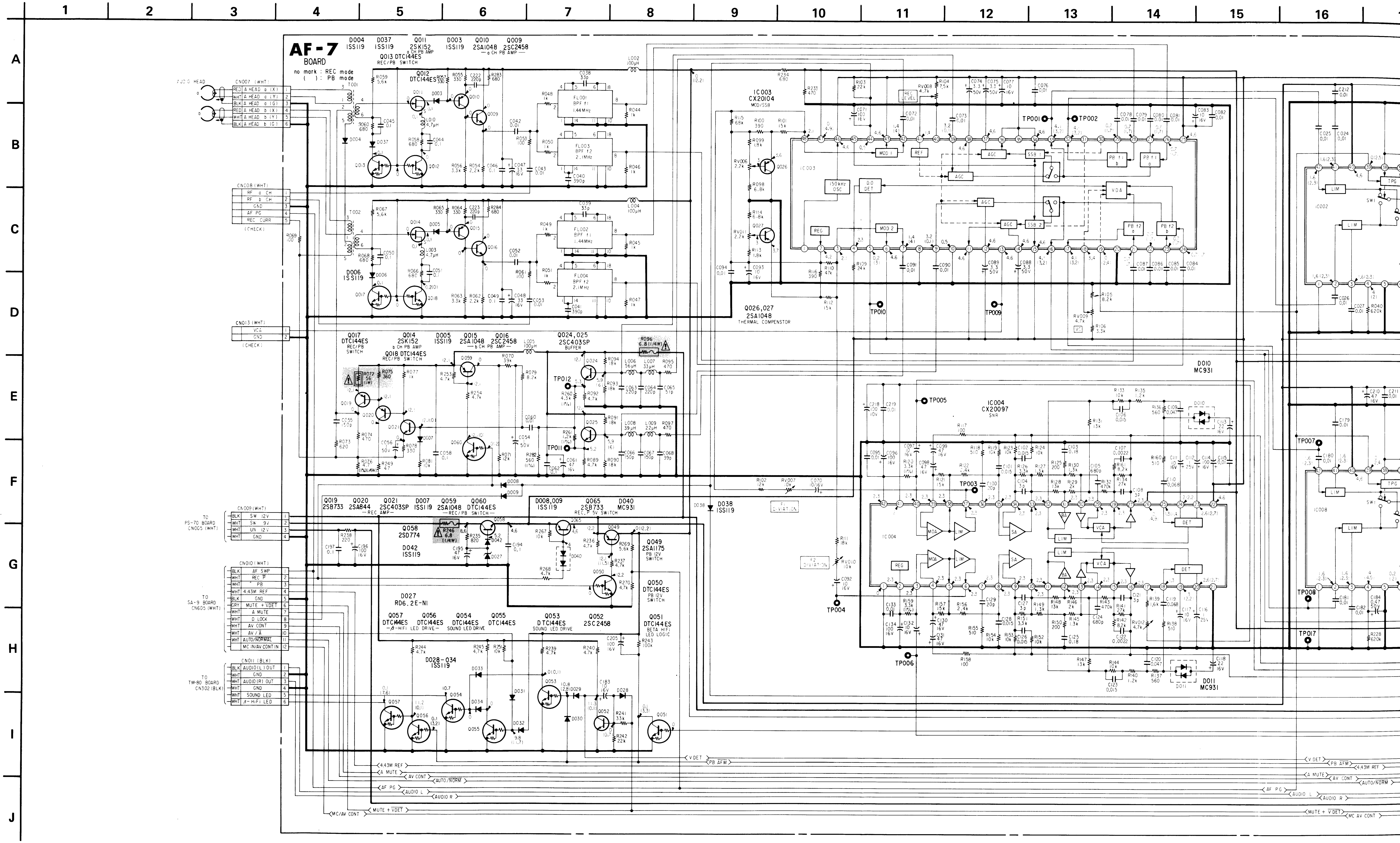
- ○—— : Indicates a leadwire mounted on the component side.
- ●—— : Indicates a leadwire mounted on the printed side.
- component side
- : B+ pattern

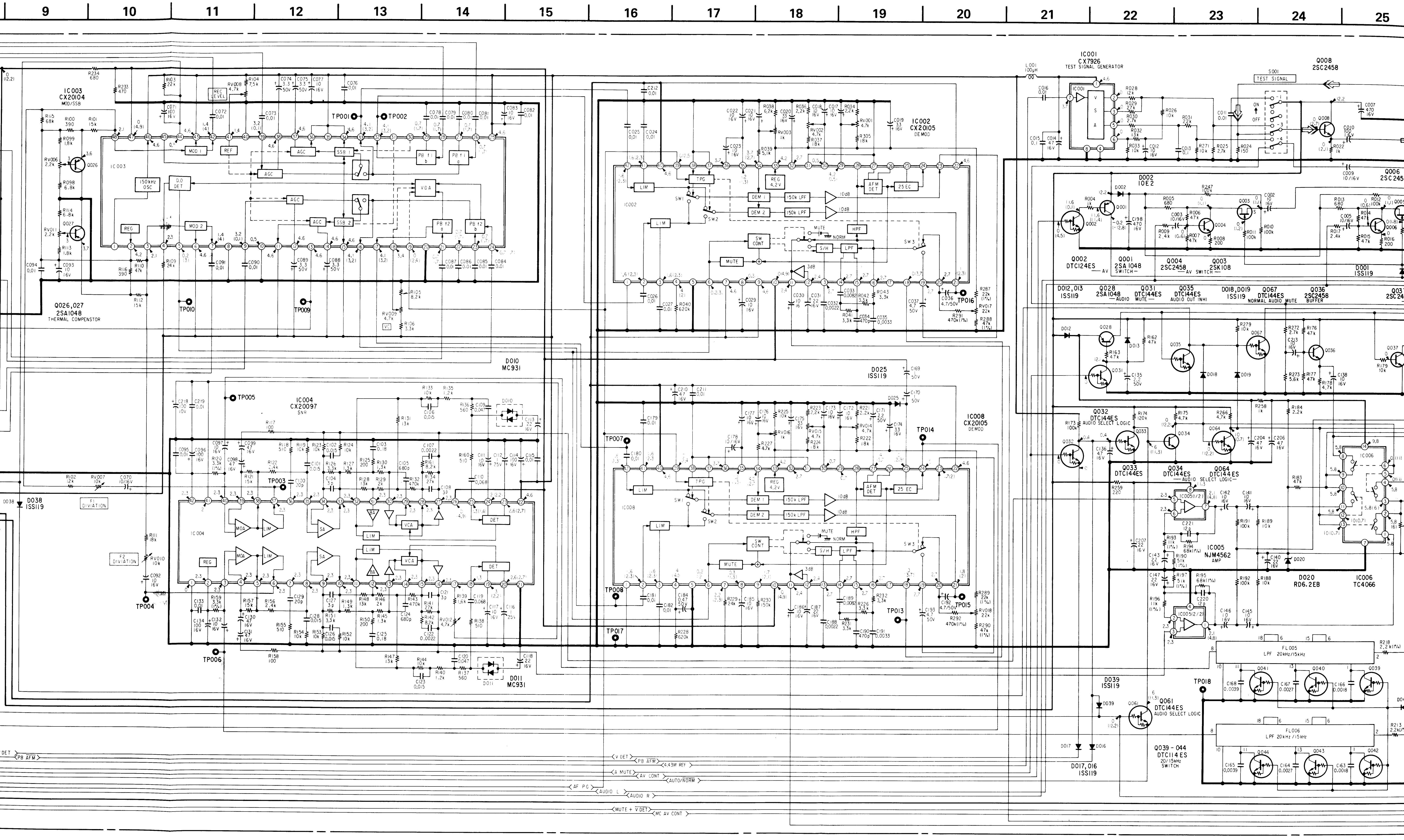



LM-8
CAPSTAN MOTOR
RD-20
REEL MOTOR
RD-21

4-4. AF-7 (AFM SIGNAL) SCHEMATIC DIAGRAM

– Ref. No. AF-7 BOARD: 3,000 series –


AF-7 BOARD
no mark : REC mode
( ) : PB mode
AUDIO HEAD
CN007 (WHT)
A HEAD a (X)
A HEAD a (Y)
A HEAD a (G)
A HEAD b (X)
A HEAD b (Y)
A HEAD b (G)
CN008 (WHT)
RF a CH
RF b CH
GND
AF PG
REC CURR
(CHECK)
CN013 (WHT)
VCA
GND
(CHECK)
CN009 (WHT)
SW 12V
SW 9V
UN 12V
GND
TO PS-70 BOARD CN005 (WHT)
CN010 (WHT)
AF SWP
REC P
PB
4.43M REF
GND
MUTE + VDET
A MUTE
D LOCK
AV CONT
AV / A
AUTO/NORMAL
MC IN/AV CONT IN
TO SA-9 BOARD CN605 (WHT)
CN011 (BLK)
AUDIO (L) OUT
GND
AUDIO (R) OUT
GND
SOUND LED
β-HiFi LED
TO TM-80 BOARD CN302 (BLK)
D004 1SS119
D037 1SS119
Q011 2SK152 a CH PB AMP
D003 1SS119
Q010 2SA1048
Q009 2SC2458 a CH PB AMP
Q013 DTC144ES REC/PB SWITCH
Q012 DTC144ES
FL001 BPF f1 1.44MHz
FL003 BPF f2 2.1MHz
FL002 BPF f1 1.44MHz
FL004 BPF f2 2.1MHz
L002 100μH
L004 100μH
D006 1SS119
Q017 DTC144ES REC/PB SWITCH
Q014 2SK152 b CH PB AMP
D005 1SS119
Q015 2SA1048
Q016 2SC2458 b CH PB AMP
Q018 DTC144ES REC/PB SWITCH
Q024,025 2SC403SP BUFFER
R096 6.8 (1/4W)
R072 56 (1W)
TP012
TP011
IC003 CX20104 MOD/SSB
Q026,027 2SA1048 THERMAL COMPENSTOR
REC LEVEL
TP001
TP002
TP010
TP009
150kHz OSC
D.O DET
MOD 1
MOD 2
REF
AGC
SSB 1
SSB 2
VDA
PB f1 b
PB f1 a
PB f2 a
PB f2 b
REG
Q019 2SB733
Q020 2SA844 REC AMP
Q021 2SC403SP
D007 1SS119
Q059 2SA1048 REC/PB SWITCH
Q060 DTC144ES
Q058 2SD774
R246 6.8 (1/4W)
D042 1SS119
D008,009 1SS119
Q065 2SB733 REC/P 5V SWITCH
D040 MC931
Q049 2SA1175 PB 12V SWITCH
Q050 DTC144ES PB 12V SWITCH
D027 RD6.2E-N1
Q057 DTC144ES β-HiFi LED DRIVE
Q056 DTC144ES
Q054 DTC144ES SOUND LED DRIVE
Q055 DTC144ES
Q053 DTC144ES SOUND LED DRIVE
Q052 2SC2458
Q051 DTC144ES BETA HiFi LED LOGIC
D028-034 1SS119
D038 1SS119
f1 DIVIATION
f2 DIVIATION
TP004
TP005
IC004 CX20097 SNR
D010 MC931
D011 MC931
TP003
TP006
TP007
TP008
TP017
IC008
MOA
LIM
SA
VCA
DET
IC002
TPG
SW1
4.43M REF
A MUTE
AV CONT
AUTO/NORM
AF PG
AUDIO L
AUDIO R
MC/AV CONT
MUTE + VDET
V DET
PB AFM
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J


9
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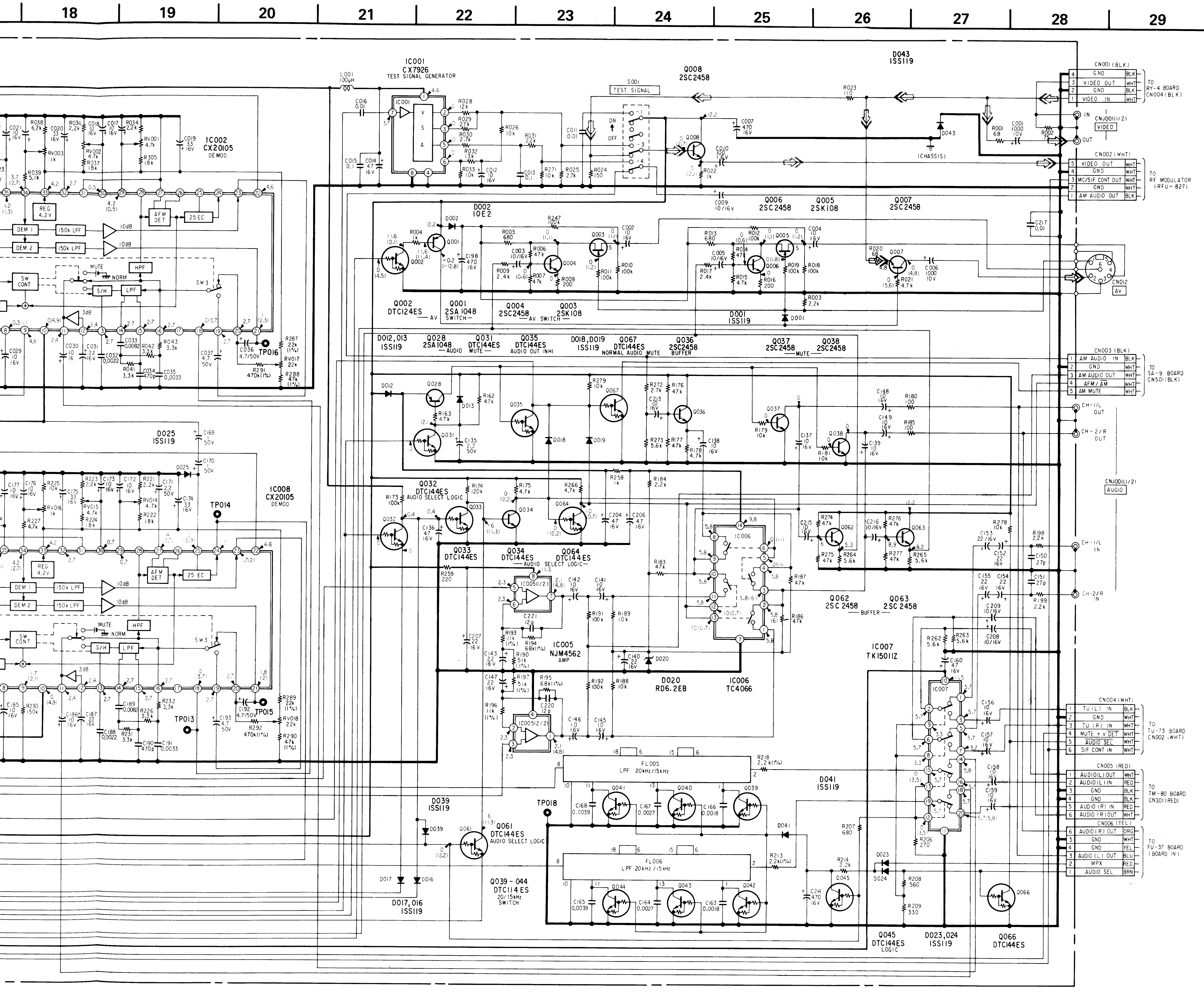
IC003 CX20104 MOD/SSB
Q026,027 2SA1048 THERMAL COMPENSTOR
TP001
TP002
TP009
TP010
IC004 CX20097 SNR
TP003
TP004
TP005
TP006
D010 MC931
D011 MC931
D038 ISS119
F1 DIVIATION
F2 DIVIATION
IC002 CX20105 DEMOD
IC008 CX20105 DEMOD
D025 ISS119
TP007
TP008
TP013
TP014
TP015
TP016
TP017
IC001 CX7926 TEST SIGNAL GENERATOR
S001 TEST SIGNAL
Q008 2SC2458
Q006 2SC245
D002 10E2
Q002 DTC124ES —AV
Q001 2SA1048 SWITCH
Q004 2SC2458
Q003 2SK108 AV SWITCH
D001 ISS119
D012,013 ISS119
Q028 2SA1048 AUDIO
Q031 DTC144ES MUTE
Q035 DTC144ES AUDIO OUT INH
D018,D019 ISS119
Q067 DTC144ES NORMAL AUDIO MUTE
Q036 2SC2458 BUFFER
Q032 DTC144ES AUDIO SELECT LOGIC
Q033 DTC144ES
Q034 DTC144ES
Q064 DTC144ES AUDIO SELECT LOGIC
IC005 NJM4562 AMP
IC006 TC4066
D020 RD6.2EB
FL005 LPF 20kHz/15kHz
FL006 LPF 20kHz/15kHz
D039 ISS119
Q061 DTC144ES AUDIO SELECT LOGIC
Q039 - 044 DTC114ES 20/15kHz SWITCH
D017,016 ISS119
TP018
PB AFM
V DET
4.43M REF
A MUTE
AV CONT
AUTO/NORM
AF PG
AUDIO L
AUDIO R
MUTE + V DET
MC AV CONT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A
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C
D
E
F
G
H
I
J
IC001
CX7926
TEST SIGNAL GENERATOR
IC002
CX20105
DEMOD
IC008
CX20105
DEMOD
S001
TEST SIGNAL
ON
OFF
Q008
2SC2458
D043
1SS119
(CHASSIS)
Q006
2SC2458
Q005
2SK108
Q007
2SC2458
D002
10E2
Q002
DTC124ES
—AV
Q001
2SA1048
SWITCH
Q004
2SC2458
Q003
2SK108
—AV SWITCH—
D001
1SS119
D012, 013
1SS119
Q028
2SA1048
—AUDIO
Q031
DTC144ES
MUTE—
Q035
DTC144ES
AUDIO OUT (NH)
D018, D019
1SS119
Q067
DTC144ES
NORMAL AUDIO MUTE
Q036
2SC2458
BUFFER
Q037
2SC2458
Q038
2SC2458
—MUTE—
D025
1SS119
Q032
DTC144ES
AUDIO SELECT LOGIC
Q033
DTC144ES
Q034
DTC144ES
Q064
DTC144ES
—AUDIO SELECT LOGIC—
IC005
NJM4562
AMP
D020
RD6.2EB
IC006
TC4066
Q062
2SC2458
Q063
2SC2458
—BUFFER—
IC007
TK15011Z
TP013
TP014
TP015
TP016
TP018
FL005
LPF 20kHz/15kHz
FL006
LPF 20kHz/15kHz
D039
1SS119
Q061
DTC144ES
AUDIO SELECT LOGIC
D017, 016
1SS119
Q039 - 044
DTC114ES
20/15kHz
SWITCH
D041
1SS119
Q045
DTC144ES
LOGIC
D023, 024
1SS119
Q066
DTC144ES
DEM 1
DEM 2
150k LPF
REG 4.2V
AFM DET
25 EC
HPF
LPF
S/H
SW CONT
MUTE
NORM
SW 3
10dB
3dB
CN001 (BLK)
4 GND BLK
3 VIDEO OUT WHT
2 GND BLK
1 VIDEO IN WHT
TO RY-4 BOARD CN004 (BLK)
IN
OUT
CNJ001(1/2)
VIDEO
R002 75
CN002 (WHT)
5 VIDEO OUT WHT
4 GND WHT
3 MC/SIF CONT OUT WHT
2 GND WHT
1 AM AUDIO OUT BLK
TO RF MODULATOR (RFU-827)
C217 0.01
CN012
AV
CN003 (BLK)
1 AM AUDIO IN BLK
2 GND WHT
3 AM AUDIO OUT WHT
4 AFM / AM WHT
5 AM MUTE WHT
TO SA-9 BOARD CN501 (BLK)
CH-1/L OUT
CH-2/R OUT
CNJ001(1/2)
AUDIO
CH-1/L IN
CH-2/R IN
CN004 (WHT)
1 TU (L) IN BLK
2 GND WHT
3 TU (R) IN WHT
4 MUTE + V DET WHT
5 AUDIO SEL WHT
6 SIF CONT IN WHT
TO TU-73 BOARD CN002 (WHT)
CN005 (RED)
1 AUDIO(L) OUT WHT
2 AUDIO (L) IN RED
3 GND BLK
4 GND BLK
5 AUDIO (R) IN RED
6 AUDIO (R) OUT WHT
TO TM-80 BOARD CN301 (RED)
CN006 (YEL)
6 AUDIO (R) OUT ORG
5 GND WHT
4 GND YEL
3 AUDIO (L) OUT BLU
2 MPX RED
1 AUDIO SEL BRN
TO FU-37 BOARD (BOARD IN)

Note:

- All resistors are in ohms, 1/6 W unless otherwise noted. kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless otherwise noted. p: μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (10 MΩ).
- ▬ : B+ bus.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

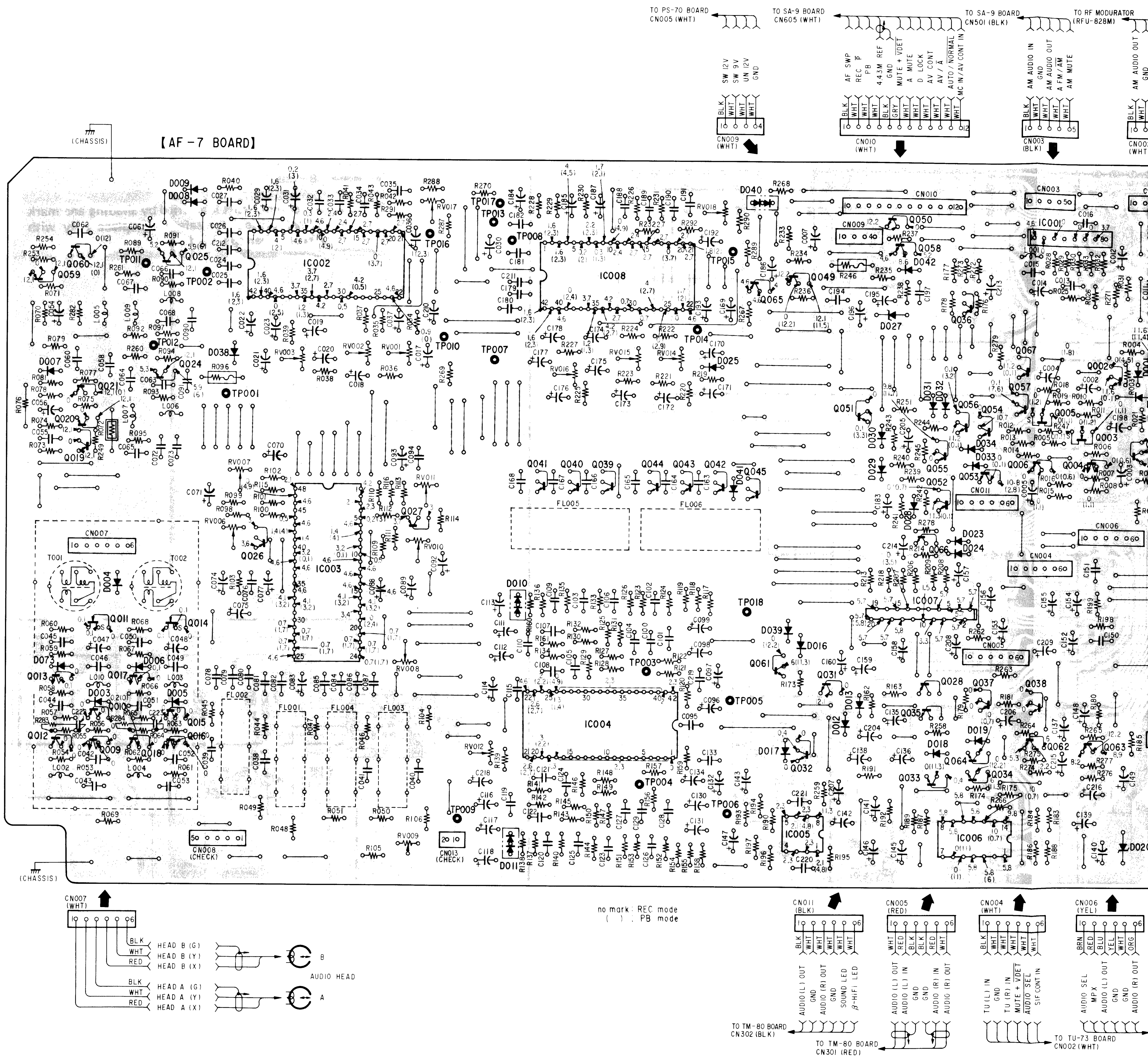
- **Signal path**

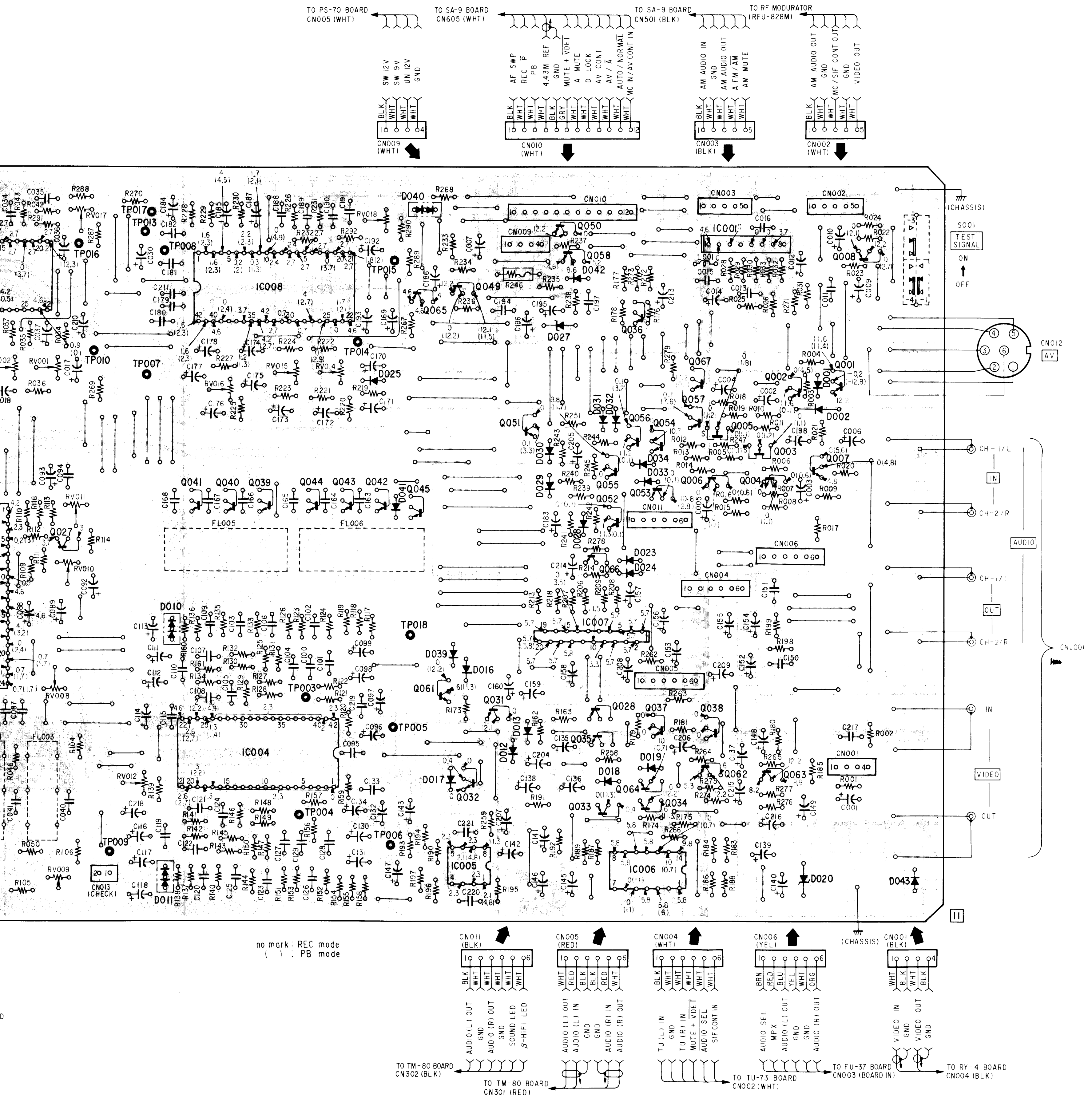
⇨ PB Y C SIGNAL

AF-7 (AFM SIGNAL) PRINTED WIRING BOARD

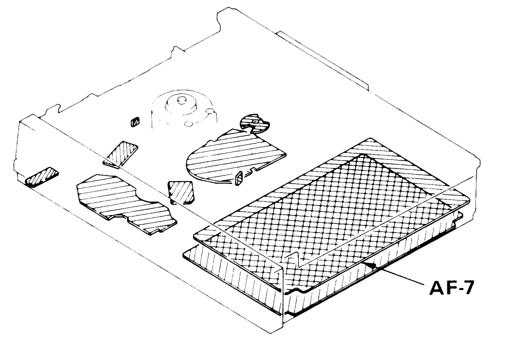
– Ref. No. AF-7 BOARD: 3,000 series –

Q , IC	D	ADJ , TP
050 IC001 058 060,025 008 IC002 059 IC008 049 065 036	009 008 040 042	RV017 017 013 RV018 016,008 015 011 002
067 024 002,001 021 057 051	027 038 025 007 001 002 031,032	010,014 RV001 012 RV002 007 RV003 RV014 RV015 RV016 001
020 056,054,005 003 019 055 007 006,004 053 041,040,039,044,043,042 045 052 027	030 034 029,033 041 028	RV007 RV011
026 066 IC003 IC007 011,014	023 024 004 010 039 016	RV006 RV010 018
061 013,017 031,028 037,038 035 010,015 IC004 012,009 062,063 018,016 032,064	073,006 003,005,013 012 019 017,018	RV008 003 005
033,034 IC005 IC006	020 011 043	RV012 004 006 009 RV009


[AF-7 BOARD]
(CHASSIS)
TO PS-70 BOARD CN005 (WHT)
SW 12V
SW 9V
UN 12V
GND
BLK WHT WHT WHT
CN009 (WHT)
TO SA-9 BOARD CN605 (WHT)
AF SWP
REC P̄
PB
4.43M REF
GND
MUTE + VDET
A MUTE
D LOCK
AV CONT
AV / Ā
AUTO / NORMAL
MC IN / AV CONT IN
BLK WHT WHT WHT BLK GRY WHT WHT WHT WHT WHT WHT
CN010 (WHT)
TO SA-9 BOARD CN501 (BLK)
AM AUDIO IN
GND
AM AUDIO OUT
A FM / AM
AM MUTE
BLK WHT WHT WHT WHT
CN003 (BLK)
TO RF MODURATOR (RFU-828M)
AM AUDIO OUT
GND
IC001
IC002
IC003
IC004
IC005
IC006
IC007
IC008
FL001
FL002
FL003
FL004
FL005
FL006
T001
T002
CN007
CN008 (CHECK)
CN013 (CHECK)
CN011
CN005
CN004
CN006
TP001
TP002
TP003
TP004
TP005
TP006
TP007
TP008
TP009
TP010
TP011
TP012
TP013
TP014
TP015
TP016
TP017
TP018
no mark : REC mode
( ) : PB mode
CN007 (WHT)
BLK HEAD B (G)
WHT HEAD B (Y)
RED HEAD B (X)
BLK HEAD A (G)
WHT HEAD A (Y)
RED HEAD A (X)
B
AUDIO HEAD
A
CN011 (BLK)
BLK WHT WHT WHT WHT WHT
AUDIO (L) OUT
GND
AUDIO (R) OUT
GND
SOUND LED
β-HiFi LED
TO TM-80 BOARD CN302 (BLK)
CN005 (RED)
WHT RED BLK BLK RED WHT
AUDIO (L) OUT
AUDIO (L) IN
GND
GND
AUDIO (R) IN
AUDIO (R) OUT
TO TM-80 BOARD CN301 (RED)
CN004 (WHT)
BLK WHT WHT WHT WHT WHT
TU (L) IN
GND
TU (R) IN
MUTE + VDET
AUDIO SEL
SIF CONT IN
TO TU-73 BOARD CN002 (WHT)
CN006 (YEL)
BRN RED BLU YEL WHT ORG
AUDIO SEL
MPX
AUDIO (L) OUT
GND
GND
AUDIO (R) OUT


TO PS-70 BOARD CN005 (WHT)
TO SA-9 BOARD CN605 (WHT)
TO SA-9 BOARD CN501 (BLK)
TO RF MODURATOR (RFU-828M)
SW 12V
SW 9V
UN 12V
GND
AF SWP
REC
PB
4.43M REF
GND
MUTE + VDET
A MUTE
D LOCK
AV CONT
AV / Ā
AUTO / NORMAL
MC IN / AV CONT IN
AM AUDIO IN
GND
AM AUDIO OUT
A FM / AM
AM MUTE
AM AUDIO OUT
GND
MC / SIF CONT OUT
GND
VIDEO OUT
CN009 (WHT)
CN010 (WHT)
CN003 (BLK)
CN002 (WHT)
IC001
IC004
IC005
IC006
IC007
IC008
FL005
FL006
FL003
S001 TEST SIGNAL ON OFF
(CHASSIS)
CN012 AV
CH-1/L
CH-2/R
IN
AUDIO
OUT
VIDEO
CNJ001
TP003
TP004
TP005
TP006
TP007
TP009
TP010
TP013
TP014
TP015
TP016
TP017
TP018
CN013 (CHECK)
11
CN011 (BLK)
CN005 (RED)
CN004 (WHT)
CN006 (YEL)
CN001 (BLK)
AUDIO (L) OUT
GND
AUDIO (R) OUT
GND
SOUND LED
β-HiFi LED
AUDIO (L) OUT
AUDIO (L) IN
GND
GND
AUDIO (R) IN
AUDIO (R) OUT
TU (L) IN
GND
TU (R) IN
MUTE + VDET
AUDIO SEL
SIF CONT IN
AUDIO SEL
MPX
AUDIO (L) OUT
GND
GND
AUDIO (R) OUT
VIDEO IN
GND
VIDEO OUT
GND
TO TM-80 BOARD CN302 (BLK)
TO TM-80 BOARD CN301 (RED)
TO TU-73 BOARD CN002 (WHT)
TO FU-37 BOARD CN003 (BOARD IN)
TO RY-4 BOARD CN004 (BLK)

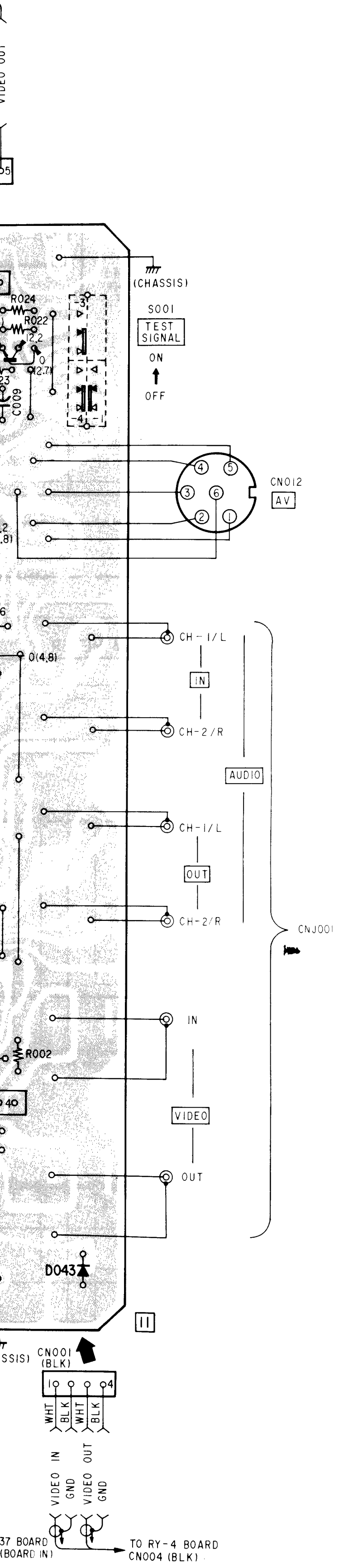
no mark : REC mode
( ) : PB mode

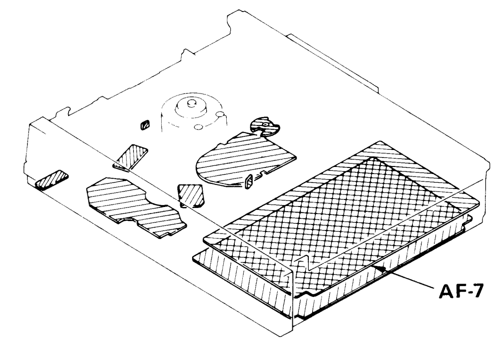


Note:

- ○— : Indicates a leadwire mounted on the component side.
- ●— : Indicates a leadwire mounted on the printed side.
- ▒ : soldering side.
- ▨ : B+ pattern

When indicating parts by reference number, please include the board name.


VIDEO OUT
(CHASSIS)
R024
R022
S001
TEST SIGNAL
ON
OFF
CN012
AV
CH-1/L
IN
CH-2/R
AUDIO
CH-1/L
OUT
CH-2/R
CNJ001
IN
VIDEO
OUT
R002
D043
11
CN001 (BLK)
WHT
BLK
WHT
BLK
VIDEO IN
GND
VIDEO OUT
GND
37 BOARD (BOARD IN)
TO RY-4 BOARD CN004 (BLK)



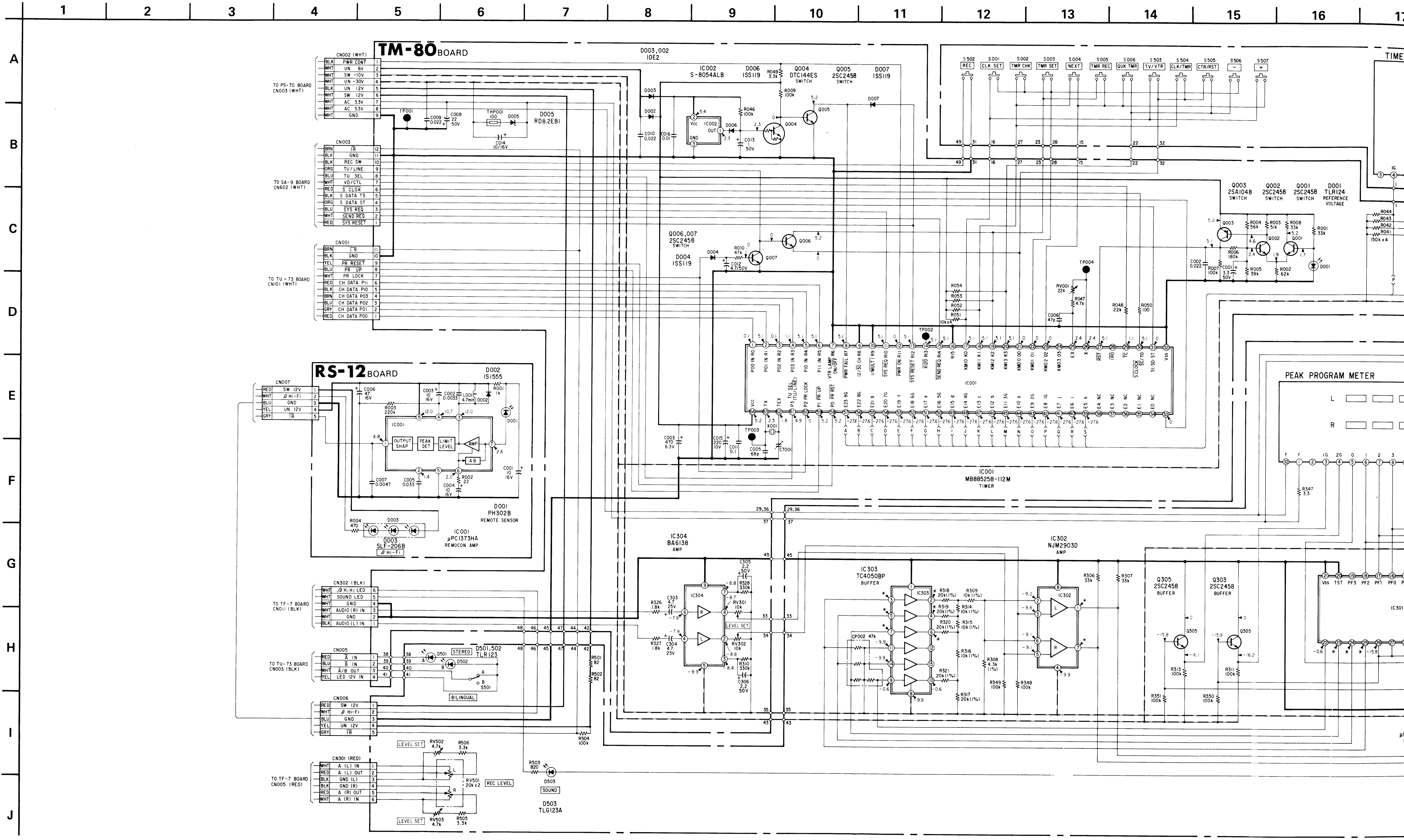
Note:

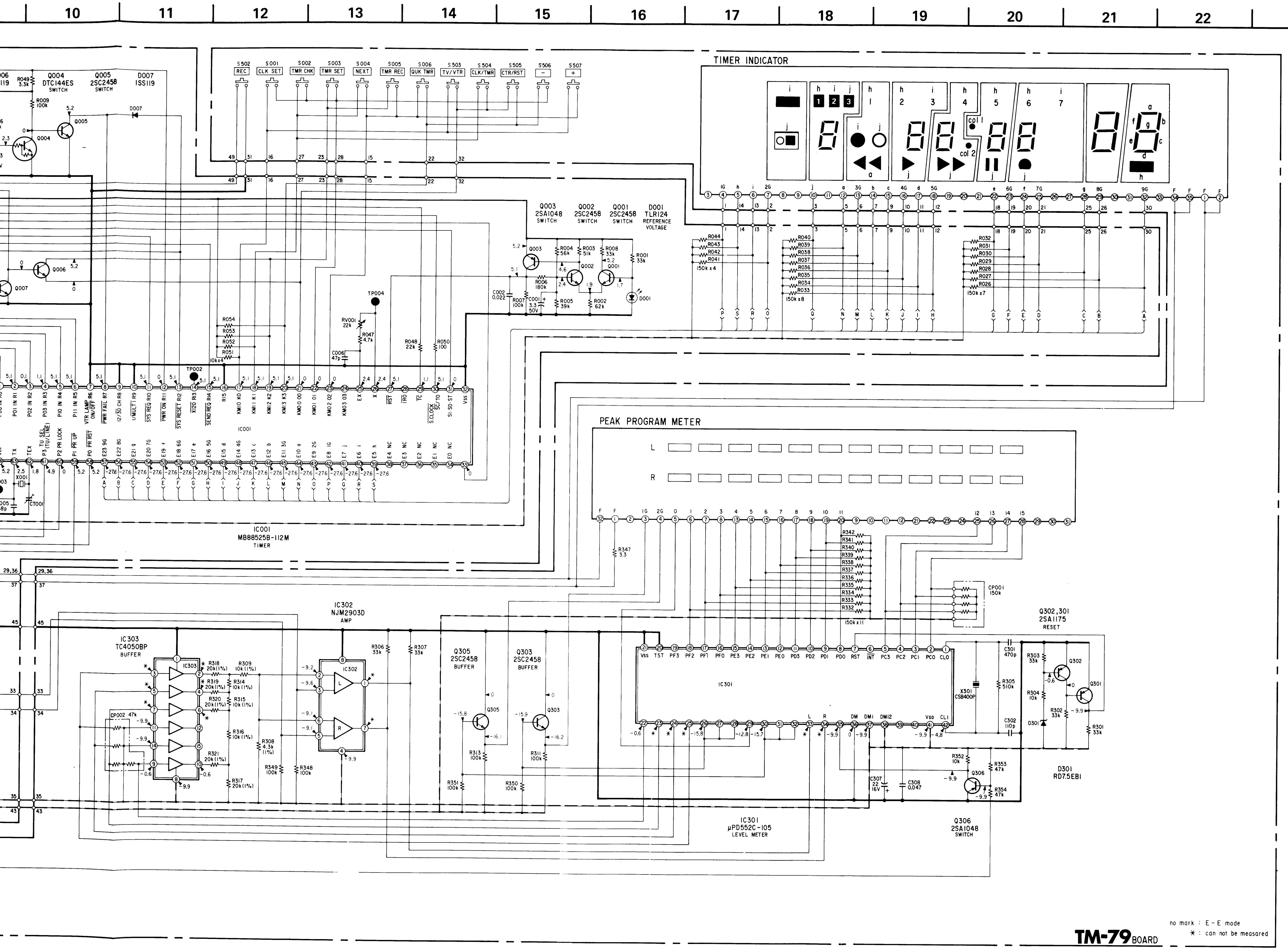
- ○—— : Indicates a leadwire mounted on the component side.
- ●—— : Indicates a leadwire mounted on the printed side.
- ▨ : soldering side.
- : B+ pattern

When indicating parts by reference number, please include the board name.

4-5. TM-79 (CHANNEL SWITCH, INDICATOR), TM-80 (TIMER), FU-37 (CASSETTE CONTROL SWITCH), RS-12 (REMOTE CONTROL), HP-14 (HEADPHONES) SCHEMATIC DIAGRAMS

– Ref. No. TM-79 BOARD: 6,000 series, TM-80 BOARD: 6,000 series, FU-37 BOARD: 7,300 series, RS-12 BOARD: 7,000 series, HP-14 BOARD: 5,400 series –

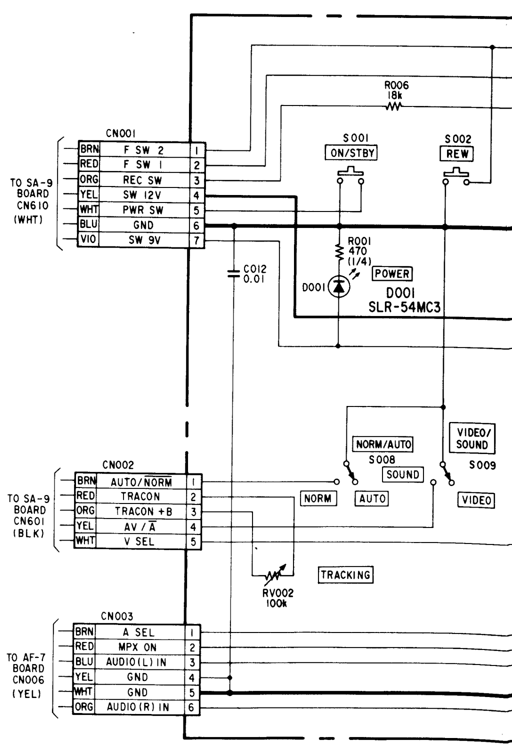

TM-80 BOARD
CN002 (WHT)
PWR CONT
UN 6V
SW -10V
UN -30V
UN 12V
SW 12V
AC 3.3V
AC 3.3V
GND
TO PS-70 BOARD CN003 (WHT)
CN003
TO SA-9 BOARD CN602 (WHT)
TU/LINE
TU SEL
VD/CTL
S CLOK
S DATA TS
S DATA ST
SYS REQ
SEND REQ
SYS RESET
CN001
TO TU-73 BOARD CN101 (WHT)
PR RESET
PR UP
PR LOCK
CH DATA P11
CH DATA P10
CH DATA P03
CH DATA P02
CH DATA P01
CH DATA P00
TP001
THP001 100
D005 RD8.2EB1
D003,002 10E2
IC002 S-8054ALB
D006 1SS119
Q004 DTC144ES SWITCH
Q005 2SC2458 SWITCH
D007 1SS119
Q006,007 2SC2458 SWITCH
D004 1SS119
S502 REC
S001 CLK SET
S002 TMR CHK
S003 TMR SET
S004 NEXT
S005 TMR REC
S006 QUK TMR
S503 TV/VTR
S504 CLK/TMR
S505 CTR/RST
S506 –
S507 +
Q003 2SA1048 SWITCH
Q002 2SC2458 SWITCH
Q001 2SC2458 SWITCH
D001 TLR124 REFERENCE VOLTAGE
TP004
TP002
TP003
IC001 MB88525B-112M TIMER
RS-12 BOARD
CN007
SW 12V
β Hi-Fi
GND
UN 12V
IR
D002 1S1555
IC001
OUTPUT SHAP
PEAK DET
LIMIT LEVEL
AMP
AB
D001 PH302B REMOTE SENSOR
IC001 μPC1373HA REMOCON AMP
D003 SLF-206B
β Hi-Fi
IC304 BA6138 AMP
IC303 TC4050BP BUFFER
IC302 NJM2903D AMP
Q305 2SC2458 BUFFER
Q303 2SC2458 BUFFER
PEAK PROGRAM METER
TIMER
CN302 (BLK)
β Hi-Fi LED
SOUND LED
AUDIO (R) IN
AUDIO (L) IN
TO TF-7 BOARD CN011 (BLK)
CN005
TO TU-73 BOARD CN003 (BLK)
A IN
B IN
A/B OUT
LED 12V IN
STEREO
D501,502 TLR123
BILINGUAL
S501
CN006
CN301 (RED)
TO TF-7 BOARD CN005 (RED)
A (L) IN
A (L) OUT
GND (L)
GND (R)
A (R) OUT
A (R) IN
LEVEL SET
RV502 4.7k
R506 3.3k
RV501 20k x 2
REC LEVEL
RV503 4.7k
R505 3.3k
R503 820
D503
SOUND
D503 TLG123A
LEVEL SET
RV301 10k
RV302 10k

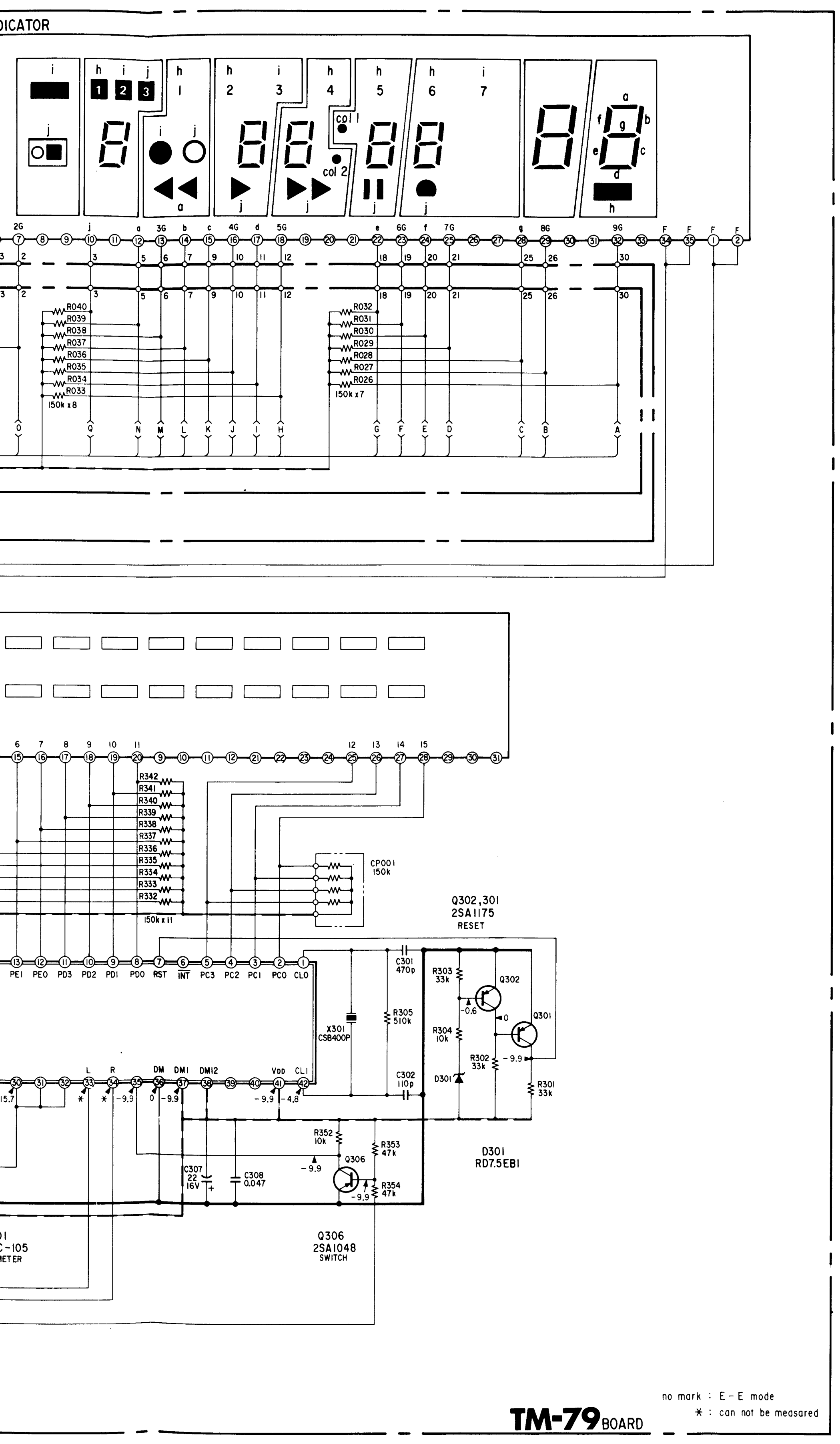

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
TIMER INDICATOR
S502 REC
S001 CLK SET
S002 TMR CHK
S003 TMR SET
S004 NEXT
S005 TMR REC
S006 QUK TMR
S503 TV/VTR
S504 CLK/TMR
S505 CTR/RST
S506 –
S507 +
Q004 DTC144ES SWITCH
Q005 2SC2458 SWITCH
D007 1SS119
Q003 2SA1048 SWITCH
Q002 2SC2458 SWITCH
Q001 2SC2458 SWITCH
D001 TLR124 REFERENCE VOLTAGE
TP004
TP002
RV001 22k
IC001
IC001 MB88525B-112M TIMER
PEAK PROGRAM METER
L
R
CP001 150k
150k x11
150k x4
150k x8
150k x7
IC303 TC4050BP BUFFER
IC302 NJM2903D AMP
Q305 2SC2458 BUFFER
Q303 2SC2458 BUFFER
Q302,301 2SA1175 RESET
IC301
IC301 μPD552C-105 LEVEL METER
X301 CSB400P
Q306 2SA1048 SWITCH
D301 RD7.5EB1
TM-79 BOARD
no mark : E-E mode
✱ : can not be measured

Note:

- All resistors are in ohms, $1/_6$ W
  kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless o
  50WV or less are not indicated e
- All variable and adjustable resist
  curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- The red lines show the main voltag
- All voltages are dc measured with a
- ▬▬ : B+ bus.
- ▬ ▬ ▬ : B– bus.

**Note: The components identifie
⚠ are critical for safet
part number specified.**

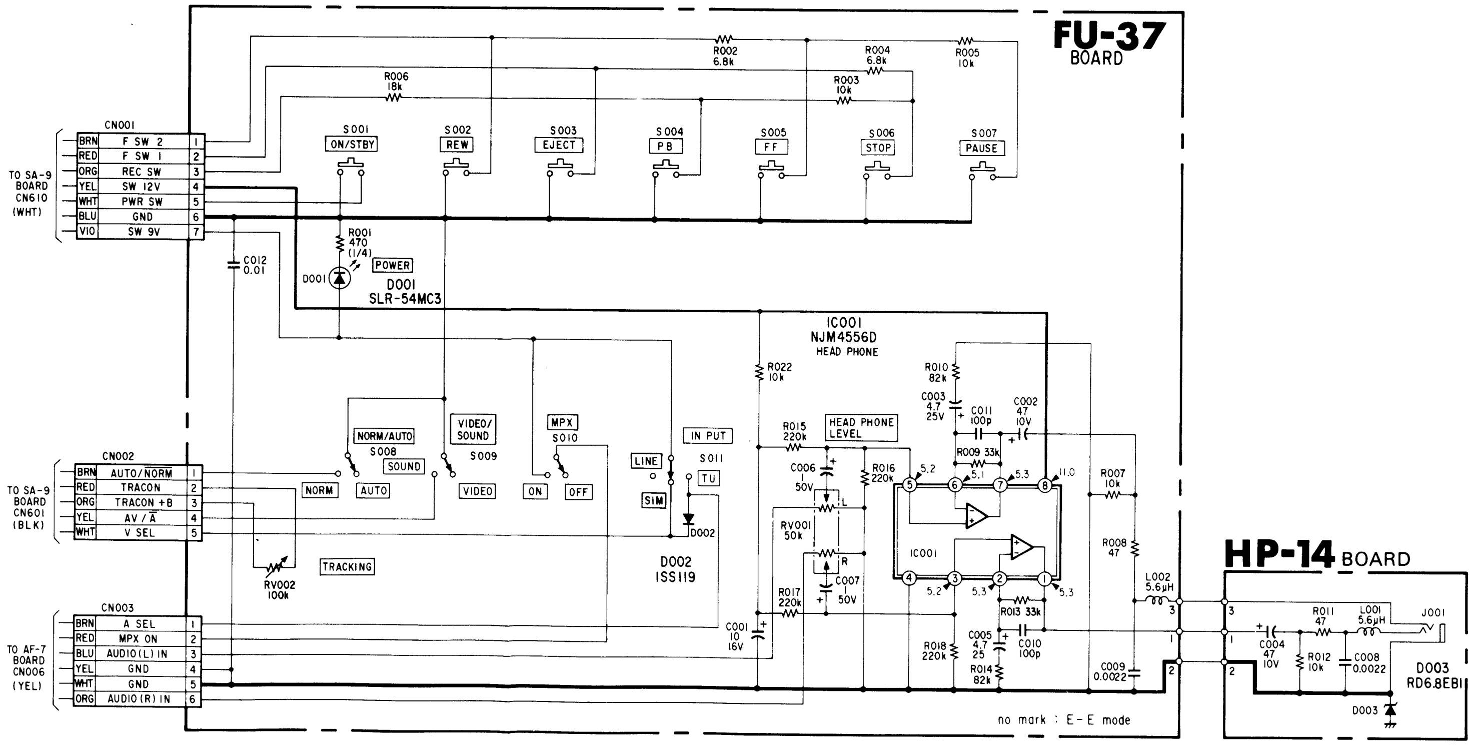

TO SA-9 BOARD CN610 (WHT)
CN001
BRN F SW 2
RED F SW 1
ORG REC SW
YEL SW 12V
WHT PWR SW
BLU GND
VIO SW 9V
R006 18k
S001 ON/STBY
S002 REW
C012 0.01
R001 470 (1/4)
D001 SLR-54MC3
POWER
TO SA-9 BOARD CN601 (BLK)
CN002
BRN AUTO/NORM
RED TRACON
ORG TRACON +B
YEL AV / A
WHT V SEL
NORM/AUTO
S008
SOUND
NORM
AUTO
VIDEO/SOUND
S009
VIDEO
TRACKING
RV002 100k
TO AF-7 BOARD CN006 (YEL)
CN003
BRN A SEL
RED MPX ON
BLU AUDIO(L) IN
YEL GND
WHT GND
ORG AUDIO(R) IN


ICATOR
R040
R039
R038
R037
R036
R035
R034
R033
150k x 8
R032
R031
R030
R029
R028
R027
R026
150k x 7
col 1
col 2
R342
R341
R340
R339
R338
R337
R336
R335
R334
R333
R332
150k x 11
CP001 150k
Q302,301 2SA1175 RESET
PEI PEO PD3 PD2 PDI PDO RST INT PC3 PC2 PCI PCO CLO
C301 470p
R303 33k
Q302
Q301
R305 510k
X301 CSB400P
R304 10k
R302 33k
D301
C302 110p
R301 33k
L R DM DMI DMI2 VDD CLI
R352 10k
Q306
R353 47k
R354 47k
C307 22 16V
C308 0.047
Q306 2SA1048 SWITCH
D301 RD7.5EB1
C-105
ETER
no mark : E-E mode
* : can not be measured
TM-79 BOARD

Note:

- All resistors are in ohms, ¹⁄₆W unless otherwise noted. kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless otherwise noted. p: μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (10 MΩ).
- ▬▬ : B+ bus.
- ▬ ▬ ▬ : B– bus.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

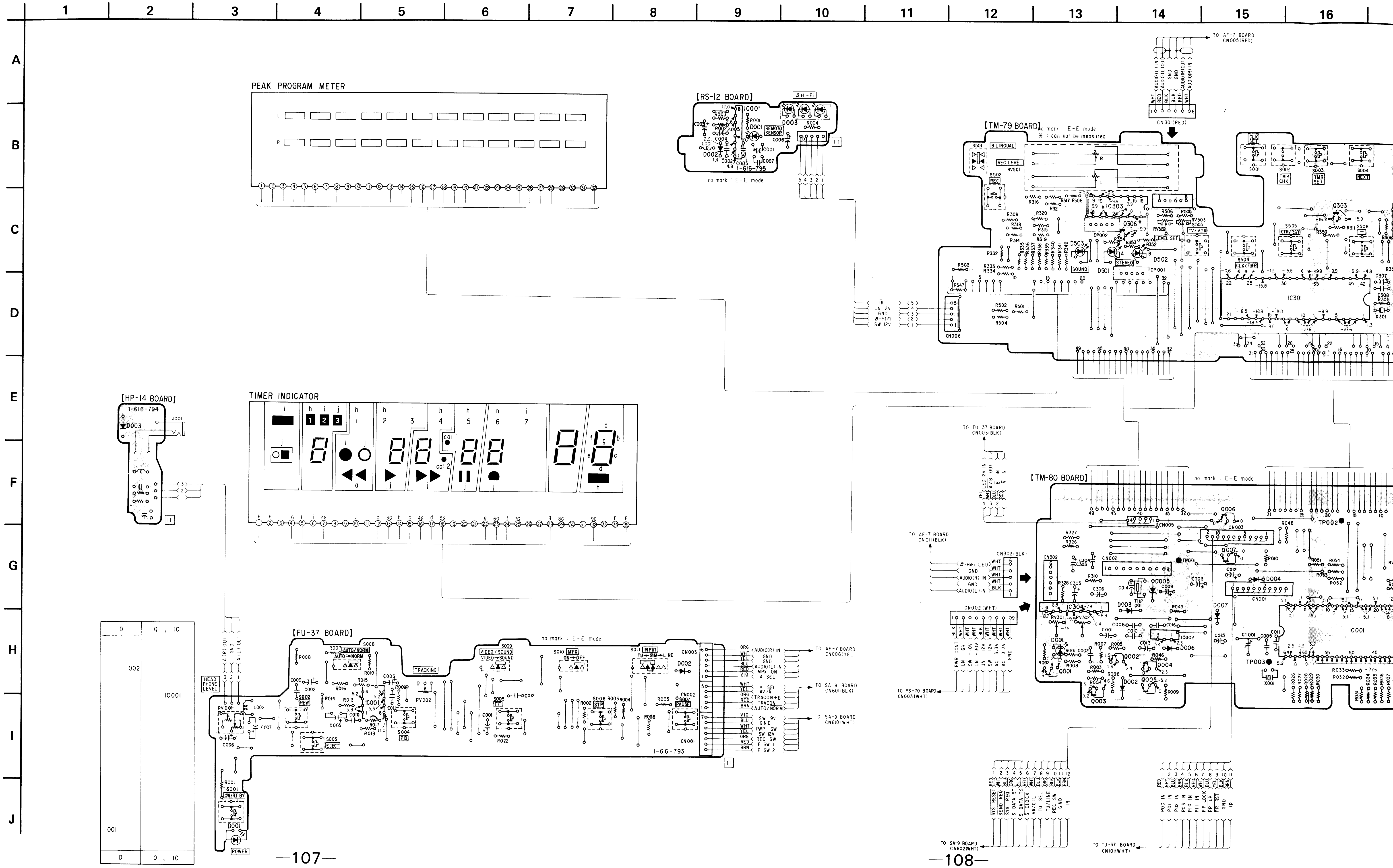

FU-37 BOARD
CN001
TO SA-9 BOARD CN610 (WHT)
BRN F SW 2 1
RED F SW 1 2
ORG REC SW 3
YEL SW 12V 4
WHT PWR SW 5
BLU GND 6
VIO SW 9V 7
R006 18k
R002 6.8k
R004 6.8k
R003 10k
R005 10k
S001 ON/STBY
S002 REW
S003 EJECT
S004 PB
S005 FF
S006 STOP
S007 PAUSE
C012 0.01
R001 470 (1/4)
POWER
D001
D001 SLR-54MC3
CN002
TO SA-9 BOARD CN601 (BLK)
BRN AUTO/NORM 1
RED TRACON 2
ORG TRACON +B 3
YEL AV / A 4
WHT V SEL 5
NORM/AUTO S008
SOUND
NORM
AUTO
VIDEO/SOUND S009
VIDEO
MPX S010
ON
OFF
IN PUT S011
LINE
TU
SIM
D002
D002 ISS119
RV002 100k
TRACKING
CN003
TO AF-7 BOARD CN006 (YEL)
BRN A SEL 1
RED MPX ON 2
BLU AUDIO (L) IN 3
YEL GND 4
WHT GND 5
ORG AUDIO (R) IN 6
IC001 NJM4556D HEAD PHONE
R022 10k
R015 220k
HEAD PHONE LEVEL
C006 1 50V
R016 220k
RV001 50k
L
R
C007 1 50V
R017 220k
C001 10 16V
R010 82k
C003 4.7 25V
C011 100p
C002 47 10V
R009 33k
5.2
5.1
5.3
11.0
IC001
5.2
5.3
5.3
R013 33k
R018 220k
C005 4.7 25
C010 100p
R014 82k
R007 10k
R008 47
L002 5.6μH
C009 0.0022
no mark : E-E mode
HP-14 BOARD
R011 47
L001 5.6μH
J001
C004 47 10V
R012 10k
C008 0.0022
D003 RD6.8EB1
D003

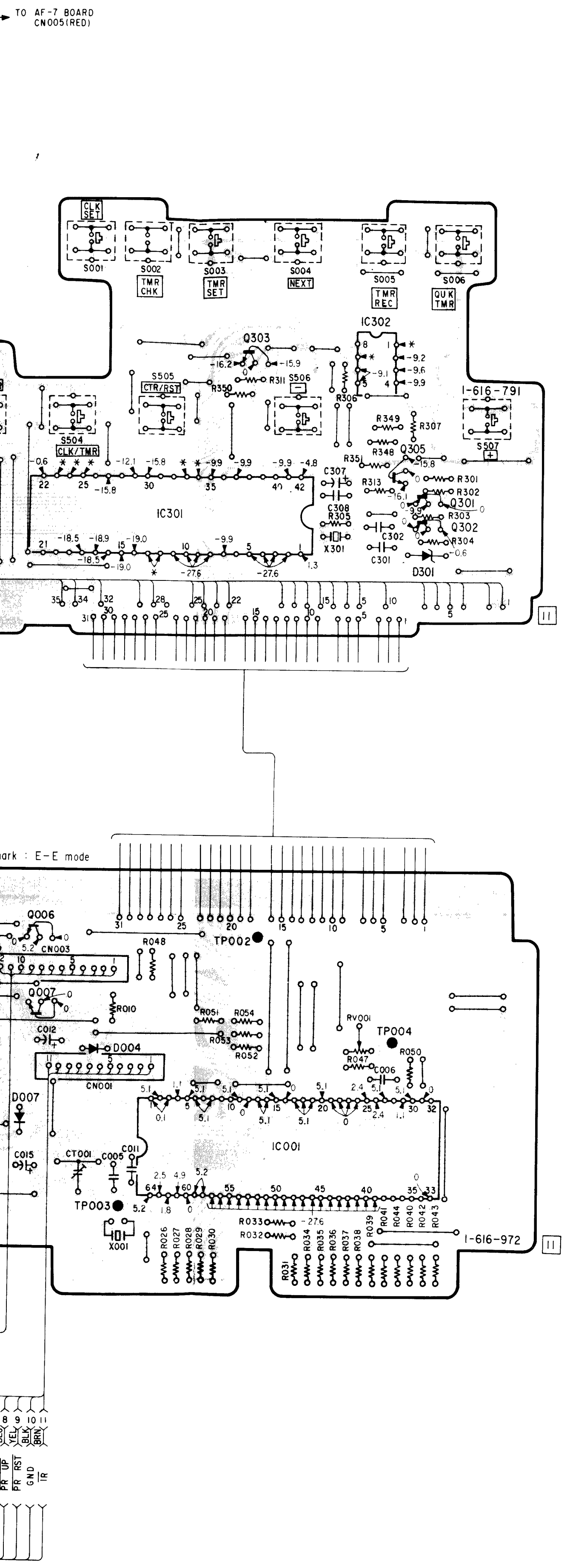
- **Signal path**

When indicating parts by reference number, please include the board name.

TM-79 (CHANNEL SWITCH, INDICATOR), TM-80 (TIMER), FU-37 (CASSETTE CONTROL SWITCH), RS-12 (REMOTE CONTROL), HP-14 (HEADPHONES) PRINTED WIRING BOARDS

– Ref. No. TM-79 BOARD: 6,000 series, TM-80 BOARD: 6,000 series, FU-37 BOARD: 7,300 series, RS-12 BOARD: 7,000 series, HP-14 BOARD: 5,400 series –


PEAK PROGRAM METER
TIMER INDICATOR
[RS-12 BOARD]
1-616-795
no mark : E-E mode
[TM-79 BOARD]
no mark : E-E mode
* : can not be measured
[HP-14 BOARD]
1-616-794
[FU-37 BOARD]
1-616-793
HEAD PHONE LEVEL
POWER
[TM-80 BOARD]
TO AF-7 BOARD CN005(RED)
TO TU-37 BOARD CN003(BLK)
TO AF-7 BOARD CN011(BLK)
TO AF-7 BOARD CN006(YEL)
TO SA-9 BOARD CN601(BLK)
TO SA-9 BOARD CN610(WHT)
TO PS-70 BOARD CN003(WHT)
TO SA-9 BOARD CN602(WHT)
TO TU-37 BOARD CN101(WHT)
BILINGUAL
REC LEVEL
REC
STEREO
SOUND
LEVEL SET
TV/VTR
CLK SET
TMR CHK
TMR SET
NEXT
CTR/RST
CLK/TMR
AUTO/NORM
REW
EJECT
PB
TRACKING
VIDEO/SOUND
FF
MPX
STP
INPUT
PAUSE
ON/ST.BY
IC301
IC303
IC304
IC001
IC002

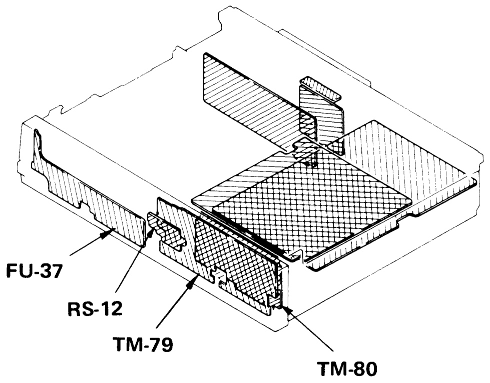

TO AF-7 BOARD CN005(RED)
CLK SET
S001
S002 TMR CHK
S003 TMR SET
S004 NEXT
S005 TMR REC
S006 QUK TMR
Q303
IC302
S505 CTR/RST
S506
S504 CLK/TMR
S507
1-616-791
IC301
C307
C308
R305
X301
C302
C301
D301
Q305
Q301
Q302
ark : E-E mode
Q006
CN003
Q007
TP002
TP004
RV001
D004
CN001
D007
TP003
X001
IC001
1-616-972

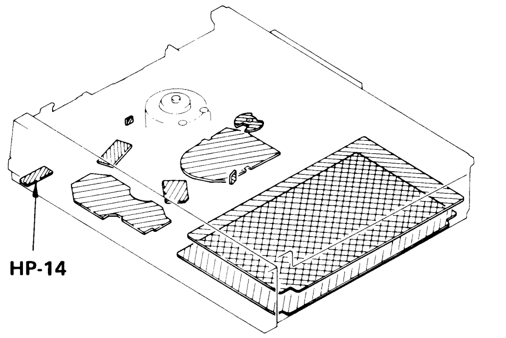
Q , IC	D	ADJ	TP
IC 303			
303, IC 305			
		502,503	
306			
	503,501,502		
305			
IC 301 301			
302			
	301		
006			002
007			
			001
		001	004
	004		
	005		
IC 304	003		
		301,302	
IC001			
	001,006		
			003
001 002 004			
003,005	002		
Q , IC	D	ADJ	TP

When indicating parts by reference number, please include the board name.

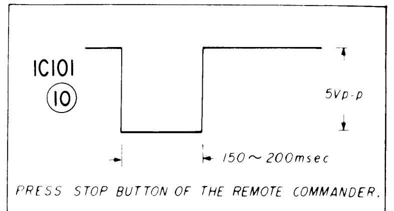
Note:

- ● ○— : Indicates a leadwire mounted on the component side.
- ● ●— : Indicates a leadwire mounted on the printed side.
- ● ░ : soldering side.
- ● ▭ : B+ pattern

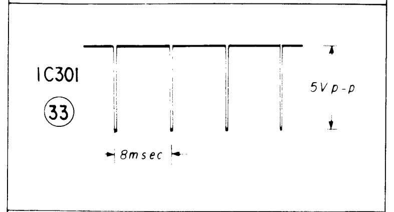

FU-37
RS-12
TM-79
TM-80

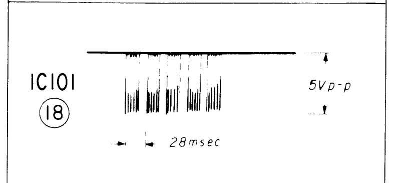


TM-79 BOARD

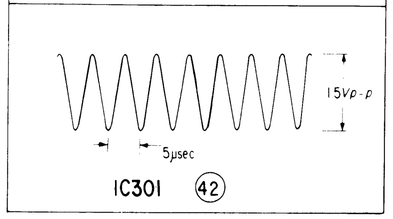


PRESS STOP BUTTON OF THE REMOTE COMMANDER.

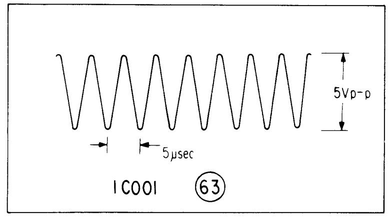




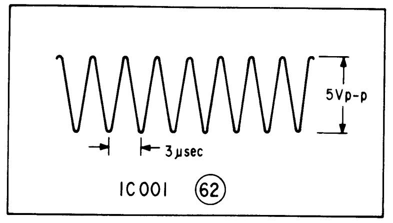
PRESS PLAY BUTTON OF THE REMOTE COMMANDER.



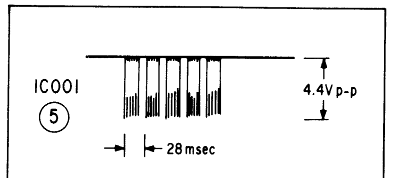
TM-80 BOARD



TM-80 BOARD



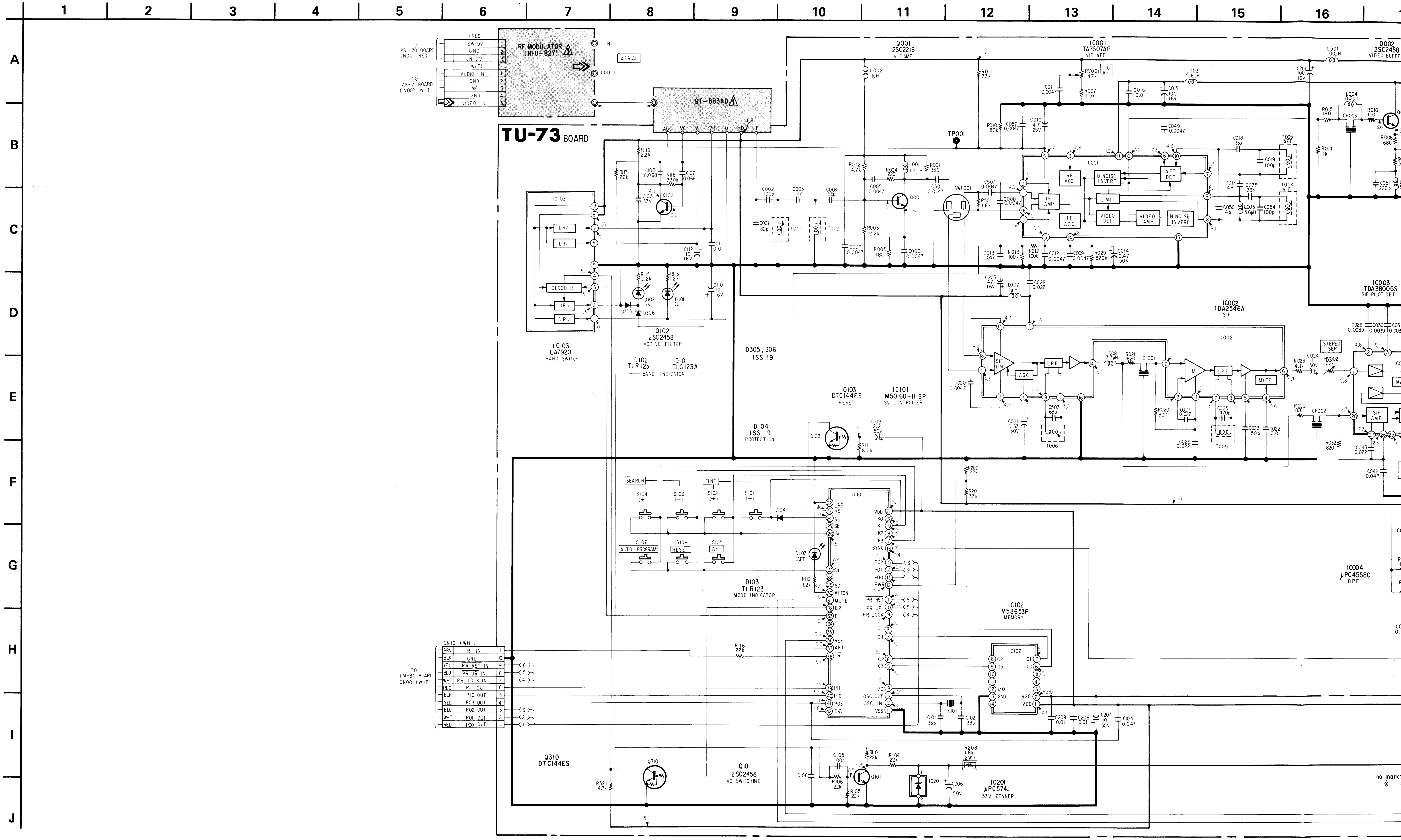
RS-12 BOARD



PRESS PLAY BUTTON OF THE REMOTE COMMANDER.

4-6. TU-73 (TUNER) SCHEMATIC DIAGRAM

– Ref. No. TU-73 BOARD: 5,000 series –


1
2
3
4
5
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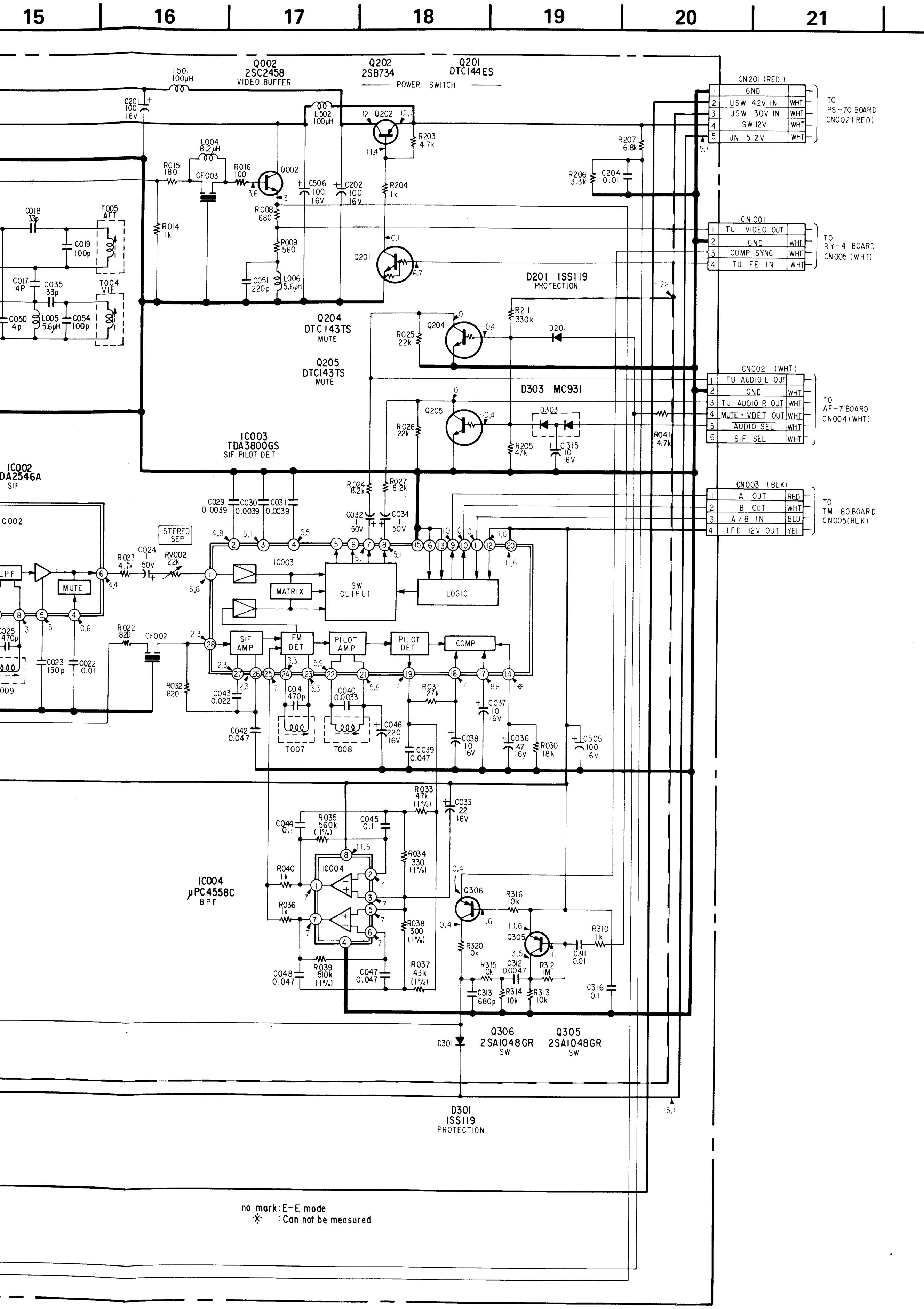
7
8
9
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
TO PS-70 BOARD CN001 (RED)
(RED)
SW 9V
GND
UN 12V
(WHT)
AUDIO IN
GND
MC
GND
VIDEO IN
TO AF-7 BOARD CN002 (WHT)
RF MODULATOR (RFU-8271)
(IN)
(OUT)
AERIAL
BT-883AD
AGC VC VL VH U +B IF
TU-73 BOARD
IC103
DRV
DECODER
IC103 LA7920 BAND SWITCH
Q102 2SC2458 ACTIVE FILTER
D102 TLR123
D101 TLG123A
BAND INDICATOR
D305, 306 1SS119
Q001 2SC2216 VIF AMP
TP001
SWF001
IC001 TA7607AP VIF AFT
RF AGC
B NOISE INVERT
AFT DET
IF AMP
IF AGC
LIMIT
VIDEO DET
VIDEO AMP
N NOISE INVERT
T005 AFT
T004 VIF
Q002 2SC2458 VIDEO BUFFER
IC003 TDA3800GS SIF PILOT DET
IC002 TDA2546A SIF
SIF LIM
AGC
LPF
LIM
MUTE
STEREO SEP
SIF AMP
T006
T009
IC004 μPC4558C BPF
Q103 DTC144ES RESET
IC101 M50160-111SP SV CONTROLLER
D104 1SS119 PROTECTION
SEARCH
FINE
S104 (+)
S103 (−)
S102 (+)
S101 (−)
S107 AUTO PROGRAM
S106 RESET
S105 AFT
D103 (AFT)
D103 TLR123 MODE INDICATOR
TEST
RST
Sa
Sb
Sc
Sd
SD
AFTON
MUTE
B2
B1
REF
AFT
IR
P11
P10
P03
D/A
VDD
K0
K1
K2
K3
SYNC
P02
P01
P00
PWR
PR RST
PR UP
PR LOCK
C0
C1
C2
C3
I/O
OSC OUT
OSC IN
VSS
IC102 M58653P MEMORY
VGG
GND
X101
CN101 (WHT)
TO TM-80 BOARD CN001 (WHT)
BRN TR IN
BLK GND
YEL PR RST IN
BLU PR UP IN
WHT PR LOCK IN
RED P11 OUT
BLK P10 OUT
YEL P03 OUT
BLU P02 OUT
WHT P01 OUT
RED P00 OUT
Q310 DTC144ES
Q101 2SC2458 VC SWITCHING
IC201 μPC574J 33V ZENNER
R208 1.8k (2W)
no mark


15
16
17
18
19
20
21
Q002 2SC2458 VIDEO BUFFER
Q202 2SB734
Q201 DTC144ES
POWER SWITCH
L501 100μH
C201 100 16V
L502 100μH
L004 8.2μH
R015 180
CF003
R016 100
R203 4.7k
R204 1k
R207 6.8k
R206 3.3k
C204 0.01
C506 100 16V
C202 100 16V
R014 1k
R008 680
R009 560
C051 220p
L006 5.6μH
C018 33p
T005 AFT
C019 100p
C017 4P
C035 33p
T004 VIF
C050 4p
L005 5.6μH
C054 100p
Q201
D201 1SS119 PROTECTION
R211 330k
D201
Q204 DTC143TS MUTE
Q205 DTC143TS MUTE
R025 22k
R026 22k
D303 MC931
R205 47k
C315 10 16V
R041 4.7k
IC003 TDA3800GS SIF PILOT DET
IC002 TDA2546A SIF
C029 0.0039
C030 0.0039
C031 0.0039
R024 8.2k
R027 8.2k
C032 50V
C034 50V
STEREO SEP
R023 4.7k
C024 50V
RV002 22k
MATRIX
SW OUTPUT
LOGIC
MUTE
R022 820
CF002
SIF AMP
FM DET
PILOT AMP
PILOT DET
COMP
R032 820
C043 0.022
C042 0.047
C041 470p
C040 0.0033
C046 220 16V
T007
T008
C039 0.047
R031 27k
C037 10 16V
C038 10 16V
C036 47 16V
R030 18k
C505 100 16V
C023 150p
C022 0.01
CN201 (RED)
1 GND
2 USW 42V IN WHT
3 USW-30V IN WHT
4 SW 12V WHT
5 UN 5.2V WHT
TO PS-70 BOARD CN002(RED)
CN001
1 TU VIDEO OUT
2 GND WHT
3 COMP SYNC WHT
4 TU EE IN WHT
TO RY-4 BOARD CN005(WHT)
CN002 (WHT)
1 TU AUDIO L OUT
2 GND WHT
3 TU AUDIO R OUT WHT
4 MUTE+VDET OUT WHT
5 AUDIO SEL WHT
6 SIF SEL WHT
TO AF-7 BOARD CN004(WHT)
CN003 (BLK)
1 A OUT RED
2 B OUT WHT
3 A/B IN BLU
4 LED 12V OUT YEL
TO TM-80 BOARD CN005(BLK)
R033 47k (1%)
C033 22 16V
C044 0.1
R035 560k (1%)
C045 0.1
R034 330 (1%)
R040 1k
R036 1k
IC004
IC004 μPC4558C BPF
R038 300 (1%)
R037 43k (1%)
C048 0.047
R039 510k (1%)
C047 0.047
Q306
R316 10k
Q305
R310 1k
C311 0.01
R320 10k
R315 10k
C312 0.0047
R312 1M
C316 0.1
C313 680p
R314 10k
R313 10k
Q306 2SA1048GR SW
Q305 2SA1048GR SW
D301
D301 1SS119 PROTECTION
no mark: E-E mode
✲ : Can not be measured

Note:

- All resistors are in ohms, 1/6 W unless otherwise noted. kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless otherwise noted. p: μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (10 MΩ).
- ━━ : B+ bus.
- ━ ━ ━ : B− bus.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- **Signal path**
  - : REC Y C SIGNAL
  - ⇨ : PB Y C SIGNAL

When indicating parts by reference number, please include the board name.

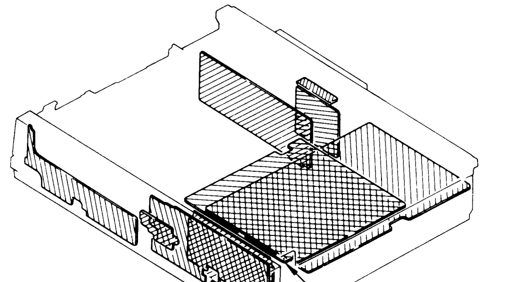
TU-73 (TUNER) PRINTED WIRING BOARD

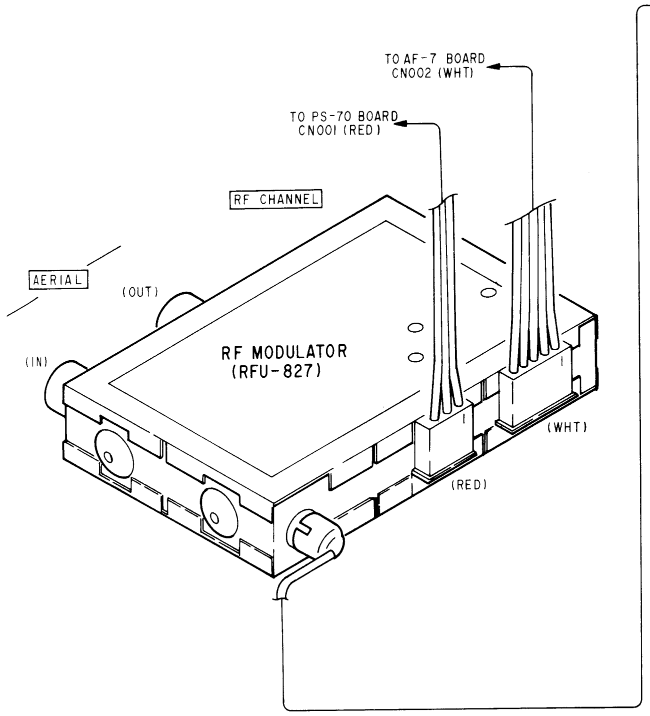
– Ref. No. TU-73 BOARD: 5,000 series –

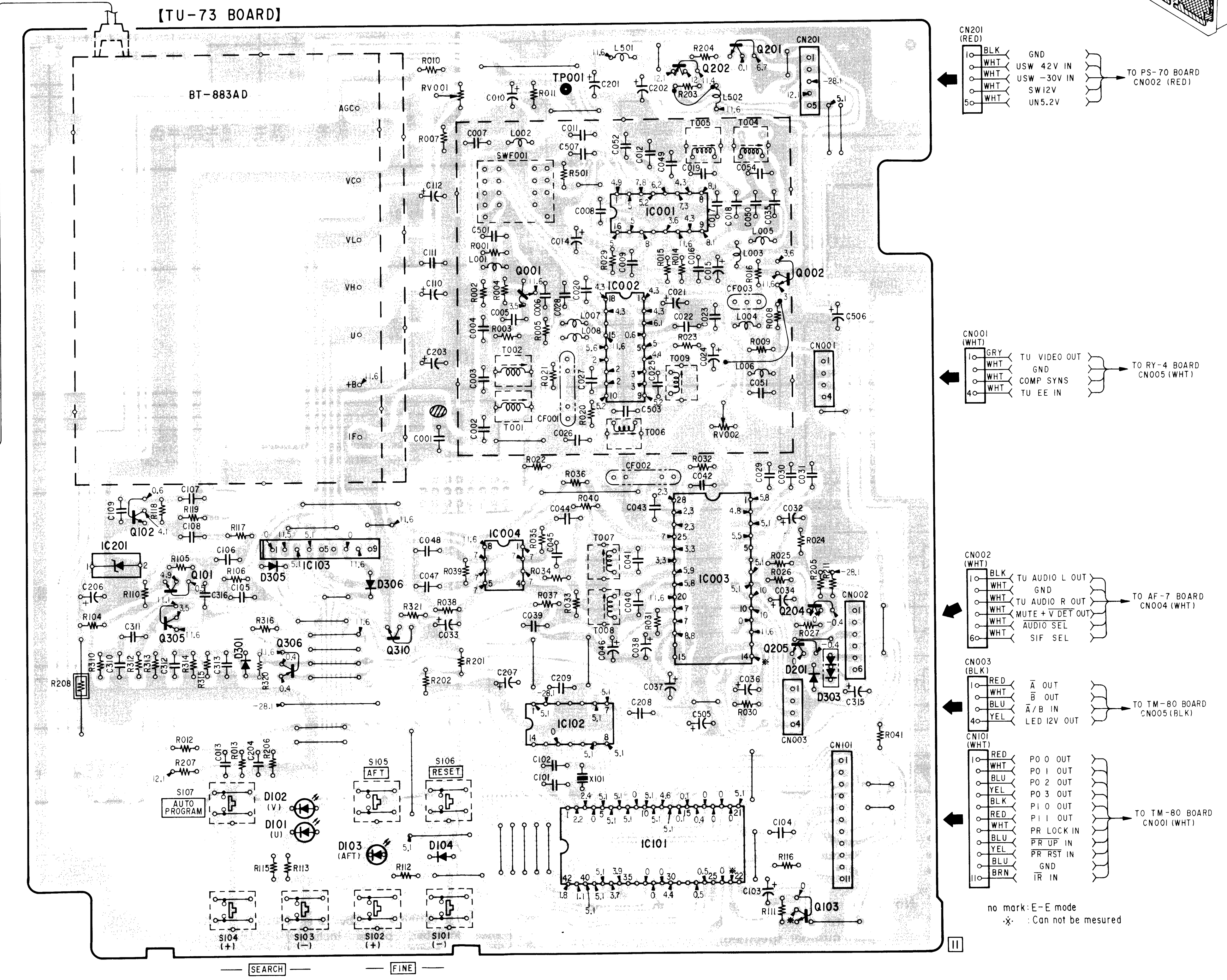
Note:

- ○— : Indicates a leadwire mounted on the component side.
- ●— : Indicates a leadwire mounted on the printed side.
- ▨ : soldering side.
- ░ : B+ pattern

	5	6	7	8	9	10	11
Q IC	IC201 102	101 305	IC103 306 310	IC004	001 IC102 IC002	202 201 IC001 IC003 IC101	002 205, 204 103
D		305 301	102 101 306 103	104			203 201
TP ADJ				RV001	001	RV002	



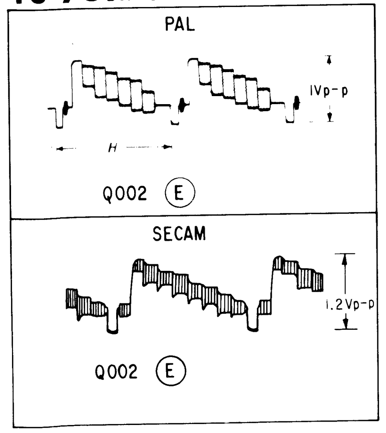

TO AF-7 BOARD
CN002 (WHT)
TO PS-70 BOARD
CN001 (RED)
RF CHANNEL
AERIAL
(OUT)
(IN)
RF MODULATOR
(RFU-827)
(WHT)
(RED)


【TU-73 BOARD】
BT-883AD
AGC
VC
VL
VH
U
+B
IF
TP001
IC001
IC002
IC003
IC004
IC101
IC102
IC103
IC201
Q001
Q002
Q101
Q102
Q103
Q201
Q202
Q204
Q205
Q305
Q306
Q310
D101 (U)
D102 (V)
D103 (AFT)
D104
D201
D301
D303
D305
D306
SWF001
CF001
CF002
CF003
X101
RV001
RV002
CN001
CN002
CN003
CN101
CN201
S101 (–)
S102 (+)
S103 (–)
S104 (+)
S105 AFT
S106 RESET
S107 AUTO PROGRAM
SEARCH
FINE
CN201 (RED)
1 BLK GND
WHT USW 42V IN
WHT USW –30V IN
WHT SW12V
5 WHT UN5.2V
TO PS-70 BOARD CN002 (RED)
CN001 (WHT)
1 GRY TU VIDEO OUT
WHT GND
WHT COMP SYNS
4 WHT TU EE IN
TO RY-4 BOARD CN005 (WHT)
CN002 (WHT)
1 BLK TU AUDIO L OUT
WHT GND
WHT TU AUDIO R OUT
WHT MUTE + V̄ D̄ĒT̄ OUT
WHT ĀŪD̄ĪŌ SEL
6 WHT SIF SEL
TO AF-7 BOARD CN004 (WHT)
CN003 (BLK)
1 RED Ā OUT
WHT B̄ OUT
BLU Ā/B IN
4 YEL LED 12V OUT
TO TM-80 BOARD CN005 (BLK)
CN101 (WHT)
1 RED PO 0 OUT
WHT PO 1 OUT
BLU PO 2 OUT
YEL PO 3 OUT
BLK PI 0 OUT
RED PI 1 OUT
WHT PR LOCK IN
BLU P̄R̄ ŪP̄ IN
YEL P̄R̄ R̄S̄T̄ IN
BLU GND
11 BRN ĪR̄ IN
TO TM-80 BOARD CN001 (WHT)
11

no mark: E-E mode
·※· : Can not be mesured

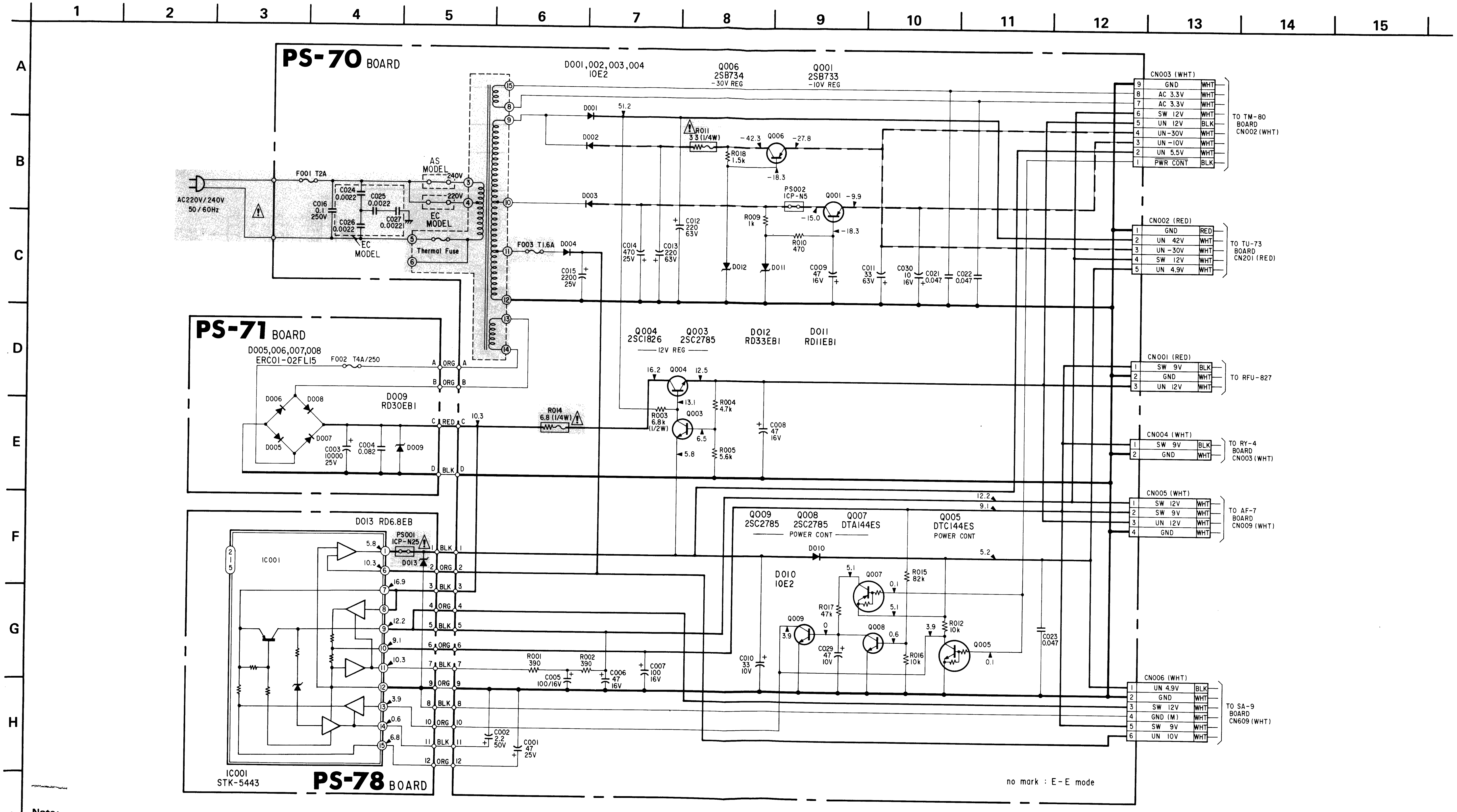
When indicating parts by reference number, please include the board name.

TU-73 BOARD



4-7. PS-70 (POWER), PS-71 (POWER), PS-78 (POWER) SCHEMATIC DIAGRAMS

– Ref. No. PS-70 BOARD: 8,000 series, PS-71 BOARD: 8,000 series, PS-78 BOARD: 8,000 series –


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I J
PS-70 BOARD
D001,002,003,004 10E2
Q006 2SB734 -30V REG
Q001 2SB733 -10V REG
AC220V/240V 50/60Hz
F001 T2A
C024 0.0022
C025 0.0022
C016 0.1 250V
C026 0.0022
C027 0.0022
AS MODEL 240V
220V
EC MODEL
Thermal Fuse
F003 T1.6A
D004
C015 2200 25V
R011 3.3(1/4W)
R018 1.5k
PS002 ICP-N5
R009 1k
R010 470
C012 220 63V
C013 220 63V
C014 470 25V
C009 47 16V
C011 33 63V
C030 10 16V
C021 0.047
C022 0.047
D012
D011
Q004 2SC1826
Q003 2SC2785
12V REG
D012 RD33EB1
D011 RD11EB1
CN003 (WHT)
9 GND
8 AC 3.3V
7 AC 3.3V
6 SW 12V
5 UN 12V
4 UN-30V
3 UN-10V
2 UN 5.5V
1 PWR CONT
TO TM-80 BOARD CN002 (WHT)
CN002 (RED)
1 GND
2 UN 42V
3 UN -30V
4 SW 12V
5 UN 4.9V
TO TU-73 BOARD CN201 (RED)
CN001 (RED)
1 SW 9V
2 GND
3 UN 12V
TO RFU-827
CN004 (WHT)
1 SW 9V
2 GND
TO RY-4 BOARD CN003 (WHT)
CN005 (WHT)
1 SW 12V
2 SW 9V
3 UN 12V
4 GND
TO AF-7 BOARD CN009 (WHT)
CN006 (WHT)
1 UN 4.9V
2 GND
3 SW 12V
4 GND (M)
5 SW 9V
6 UN 10V
TO SA-9 BOARD CN609 (WHT)
PS-71 BOARD
D005,006,007,008 ERC01-02FL15
F002 T4A/250
D009 RD30EB1
C003 10000 25V
C004 0.082
R014 6.8 (1/4W)
R003 6.8k (1/2W)
R004 4.7k
R005 5.6k
C008 47 16V
Q009 2SC2785
Q008 2SC2785
Q007 DTA144ES
POWER CONT
Q005 DTC144ES POWER CONT
D010 10E2
R015 82k
R017 47k
R012 10k
R016 10k
C029 47 10V
C010 33 10V
C023 0.047
PS-78 BOARD
D013 RD6.8EB
PS001 ICP-N25
IC001
IC001 STK-5443
R001 390
R002 390
C005 100/16V
C006 47 16V
C007 100 16V
C002 2.2 50V
C001 47 25V
no mark : E-E mode

Note:

- All resistors are in ohms, 1/6 W unless otherwise noted. kΩ: 1000 Ω, MΩ: 1000 kΩ
- All capacitors are in μF unless otherwise noted. p: μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.

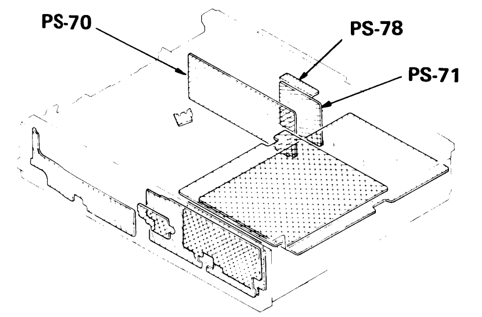
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (10 MΩ).
- ▬ : B+ bus.
- ▬ ▬ : B– bus.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

PS-70 (POWER), PS-71 (POWER), PS-78 (POWER) PRINTED WIRING BOARDS

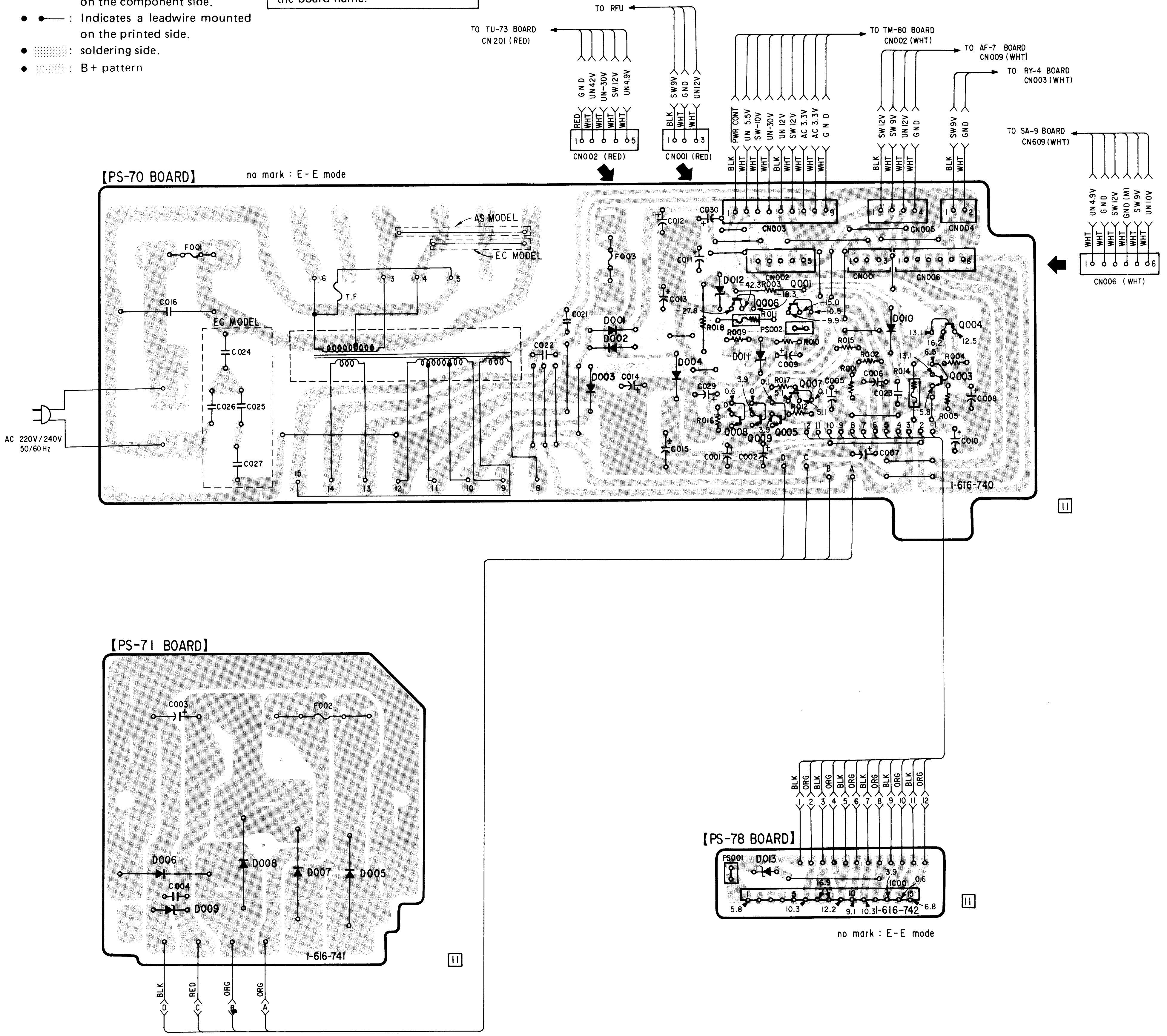
– Ref. No. PS-70 BOARD: 8,000 series, PS-71 BOARD: 8,000 series, PS-78 BOARD: 8,000 series –


PS-70
PS-78
PS-71

Note:

- ○—— : Indicates a leadwire mounted on the component side.
- ●—— : Indicates a leadwire mounted on the printed side.
- ░ : soldering side.
- ░ : B+ pattern

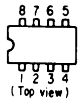
When indicating parts by reference number, please include the board name.


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I J
TO TU-73 BOARD CN201 (RED)
GND UN42V UN-30V SW12V UN4.9V
RED WHT WHT WHT WHT
CN002 (RED)
TO RFU
SW9V GND UN12V
BLK WHT WHT
CN001 (RED)
TO TM-80 BOARD CN002 (WHT)
PWR CONT UN 5.5V SW-10V UN-30V UN 12V SW 12V AC 3.3V AC 3.3V GND
BLK WHT WHT WHT BLK WHT WHT WHT WHT
TO AF-7 BOARD CN009 (WHT)
SW12V SW9V UN12V GND
BLK WHT WHT WHT
TO RY-4 BOARD CN003 (WHT)
SW9V GND
BLK WHT
TO SA-9 BOARD CN609 (WHT)
UN4.9V GND SW12V GND (M) SW9V UN10V
WHT WHT WHT WHT WHT WHT
CN006 (WHT)
【PS-70 BOARD】
no mark : E-E mode
AS MODEL
EC MODEL
F001
C016
EC MODEL
C024
C026 C025
C027
AC 220V/240V 50/60Hz
T.F
F003
C012 C030 CN003 CN005 CN004
C011 CN002 CN001 CN006
D012 42.3 R003 Q001 -18.3
Q006 -15.0 -10.5 -9.9
C013 -27.8 R018 R011
R009 PS002 R010
C021 D001 D002
C022 D003 C014 D004
D011 C009 R015 R002
D010 Q004 13.1 16.2 12.5 6.5 13.1 R004
R014 C006 C023 R001 Q003 C008 R005 5.8
C029 0.6 3.9 0.1 R017 5.1 Q007 C005 0.1 5.1 R012
R016 Q008 3.9 Q005 Q009
C015 C001 C002 C007 C010
D C B A
15 14 13 12 11 10 9 8
12 11 10 9 8 7 6 5 4 3 2 1
1-616-740
【PS-71 BOARD】
C003 F002
D006 D008 D007 D005
C004 D009
1-616-741
BLK RED ORG ORG
D C B A
BLK ORG BLK ORG BLK ORG BLK ORG BLK ORG BLK ORG
1 2 3 4 5 6 7 8 9 10 11 12
【PS-78 BOARD】
PS001 D013
16.9 3.9 IC001 0.6
1 5 10 15
5.8 10.3 12.2 9.1 10.3 6.8
1-616-742
no mark : E-E mode

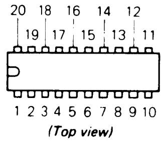
	Q, IC	D
C		012
D	6 1 4 3	001 010 002 011 004 003
E	7 8.9.5	
I	IC001	008 013 006 007 005 009
	Q, IC	D

4-8. SEMICONDUCTORS

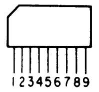
BA4558
HA17558
LM3587
NJM2903D
NJM4556D
NJM4558D
NJM4562D
µPC358C
µPC393C
µPC4558C


8 7 6 5
1 2 3 4
(Top view)

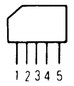
BA5116


20 18 16 14 12
19 17 15 13 11
1 2 3 4 5 6 7 8 9 10
(Top view)

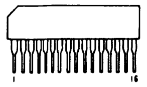
BA6138
CX894
LA7205
LA7920



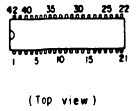
BA634



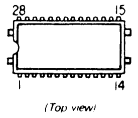
BA7007



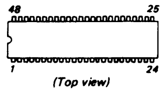
CX10021A-NP
CX10021A-P
CX10021B-NP
CX20097
CX20097A
CX20105
M50160-111SP
µPD552C-105


42 40 35 30 25 22
1 5 10 15 21
(Top view)

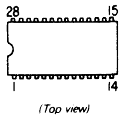
CX10023


28
15
1
14
(Top view)

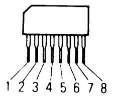
CX20043
CX20104
CX20124


48
25
1
24
(Top view)

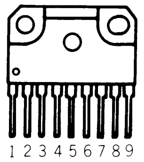
CX20045
CX866A
CX866B
TDA3800GS


28
15
1
14
(Top view)

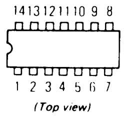
CX7926
CX20061
µPC1373H
µPC1373HA
µPC1391H
µPC1391HA



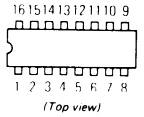
LB1640N
M54543L



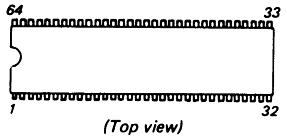
M58653P
TC4066BP


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

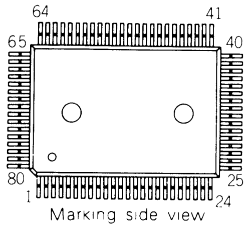
MB88201-191G
MC14538BCP
TA7607AP
TC4050BP
µPD4050BC


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

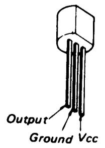
MB88525B-112M


64
33
1
32
(Top view)

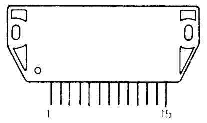
MB88551-150M


64
41
65
40
80
25
1
24
Marking side view

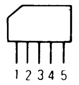
S8054ALB


Output
Ground
Vcc

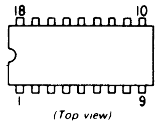
STK5443



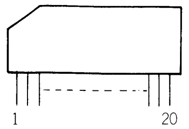
TA7060AP



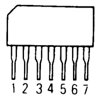
TDA2546A


18
10
1
9
(Top view)

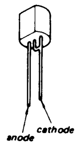
TK15011Z



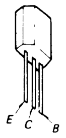
µPC1513HA



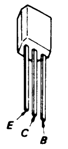
µPC574J


anode
cathode

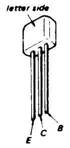
2SA1026



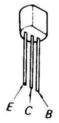
2SA1048-GR
2SA1115
2SA1115-F
2SC2458
2SC2603
2SC403SP-3
DTA114ES
DTA144ES
DTC114ES
DTC124ES
DTC143TS
DTC144ES
DTC144WS



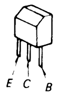
2SA1175
2SC2785


letter side
E
C
B

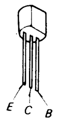
2SA733-P
2SA844
2SA844-C
2SA933S
2SC1740S



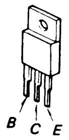
2SB733
2SB733-4
2SB734
2SD773
2SD774



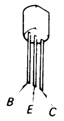
2SB739
2SB740-3
2SC1475
2SD788
2SD789
2SD789-4



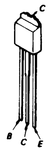
2SC1061
2SC1826
2SC2216
2SD313HP-E
2SD880-GR



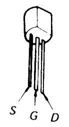
2SC2717



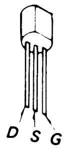
2SD1164



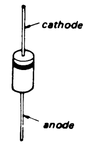
2SK108



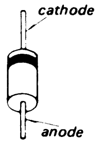
2SK152



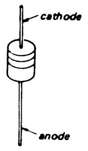
10E2


cathode
anode

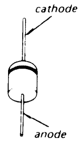
1S1555
EQA02-09D
EQA02-28B
HZ10E-B1
HZ30E-B1
HZ6.8E-B1
HZT33-02
RD10E-B1
RD11E-B1
RD30E-B1
RD5.1E-L2
RD6.2E-B
RD6.2E-N1
RD6.8E-B
RD6.8E-B1
RD7.5E-B1
RD8.2E-B
RD9 1E-B


cathode
anode

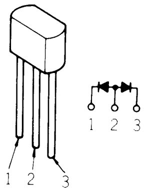
1SS119
1SS133
1SS148


cathode
anode

ERC01-02FL
ERC01-02FL15


cathode
anode

MC911



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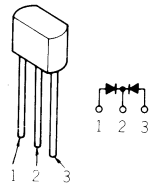

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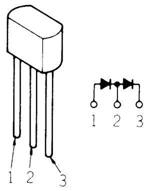
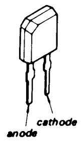
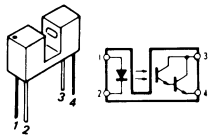


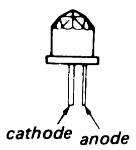
PH302B


anode
cathode

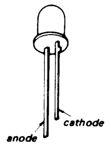
SP1201-22



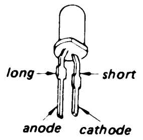
SLF206B


cathode
anode

SLR-54MC3


anode
cathode

TLG123A
TLR123
TLR124


long
short
anode
cathode

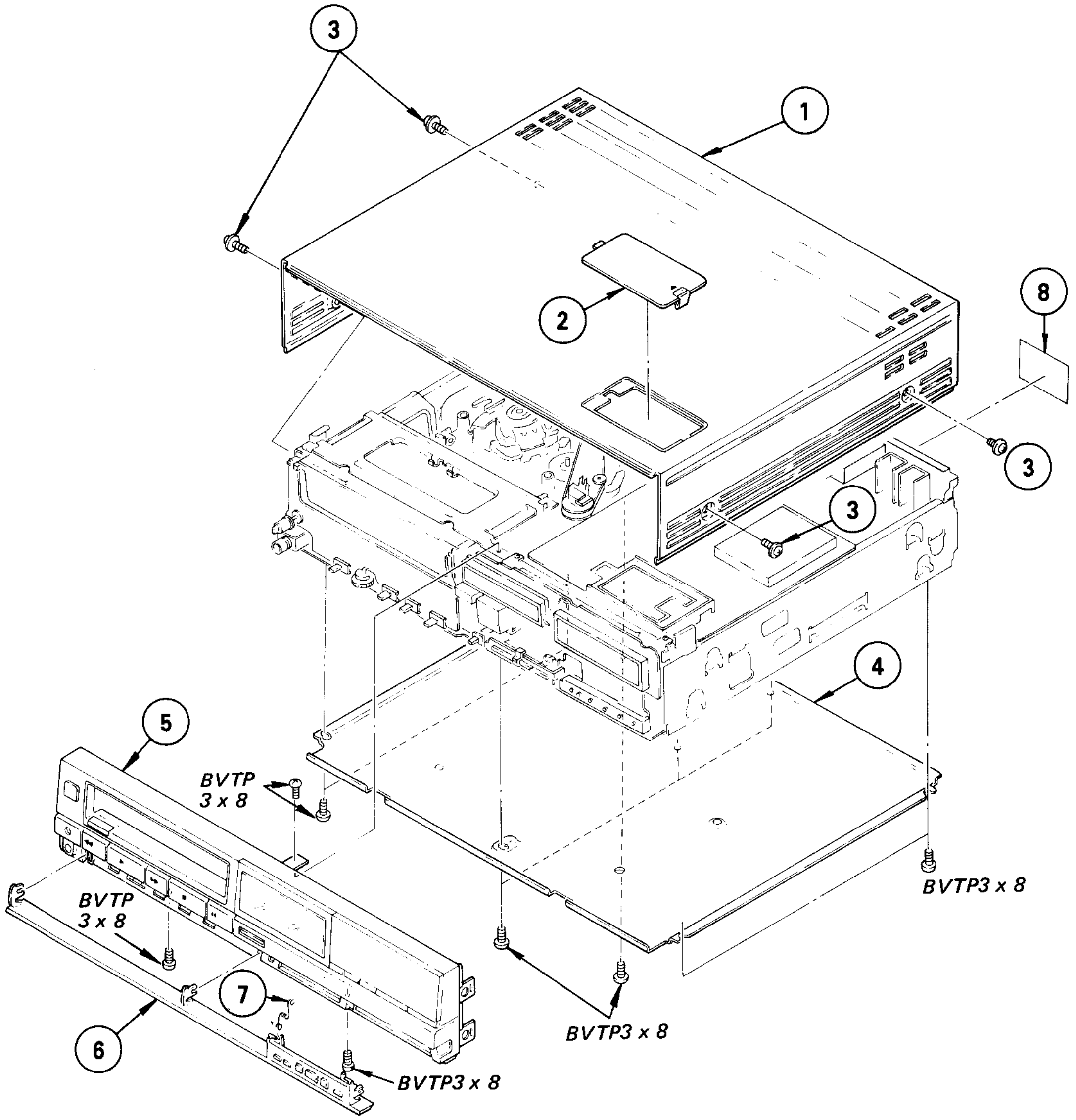
SECTION 5
EXPLODED VIEWS

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

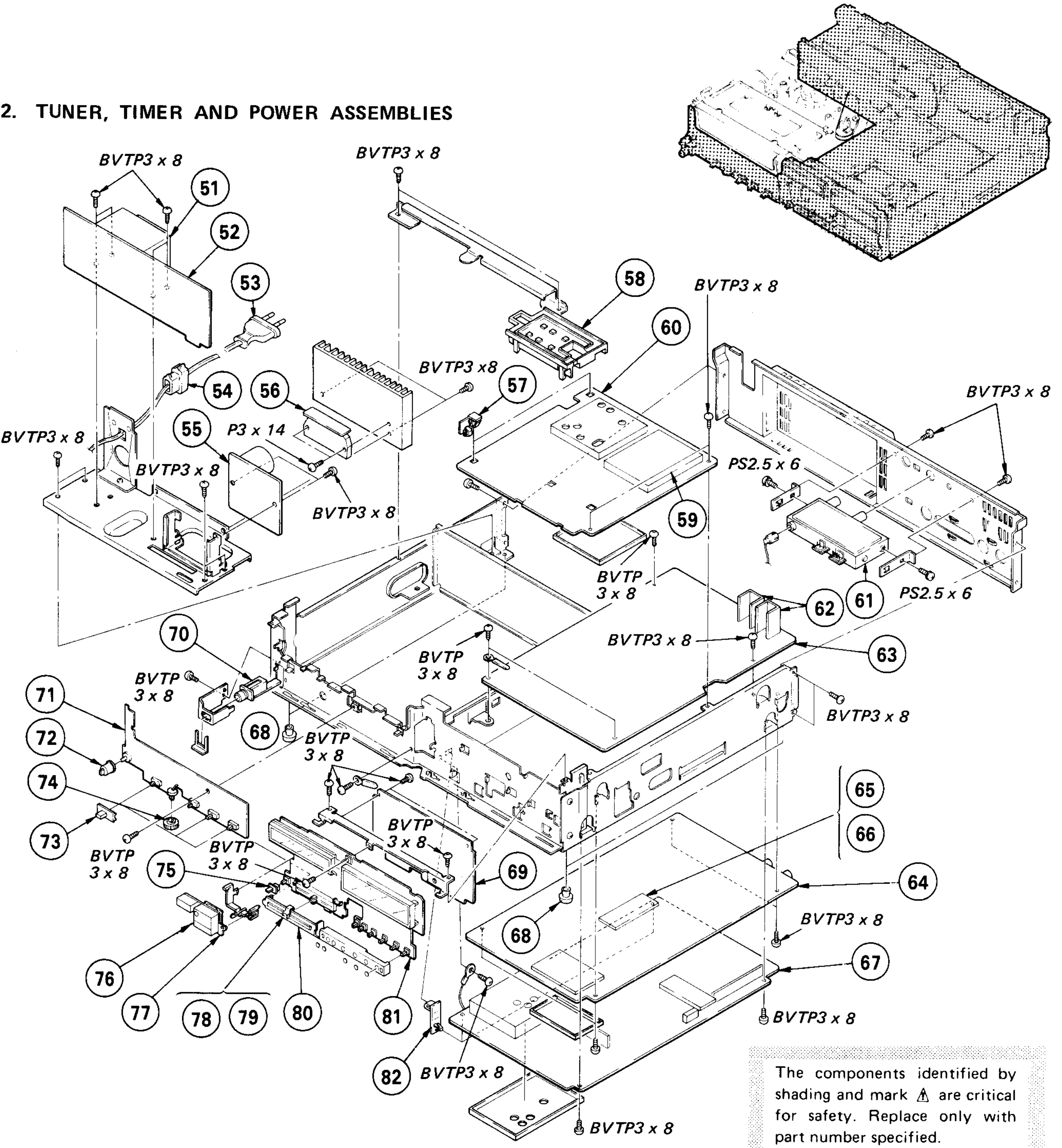
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

5-1. FRONT PANEL AND CABINET ASSEMBLIES



No.	Part No.	Description	Remark
1	*X-0774-304-0	CASE ASSY, UPPER	
2	3-684-177-01	LID, PRESET	
3	4-886-821-01	SCREW, M3 CASE	
4	*3-696-147-01	PLATE, BOTTOM	
5	X-0774-301-0	PANEL BLOCK ASSY, FRONT (EC MODEL)	
	X-0774-323-0	PANEL BLOCK ASSY, FRONT (AS MODEL)	
6	X-0774-302-0	DOOR ASSY, FRONT	
7	3-696-118-01	SPRING	
8	*3-696-149-01	LABEL, MODEL NUMBER (NO.1) (EC MODEL)	
	*3-696-150-01	LABEL, MODEL NUMBER (NO.1) (AS MODEL)	

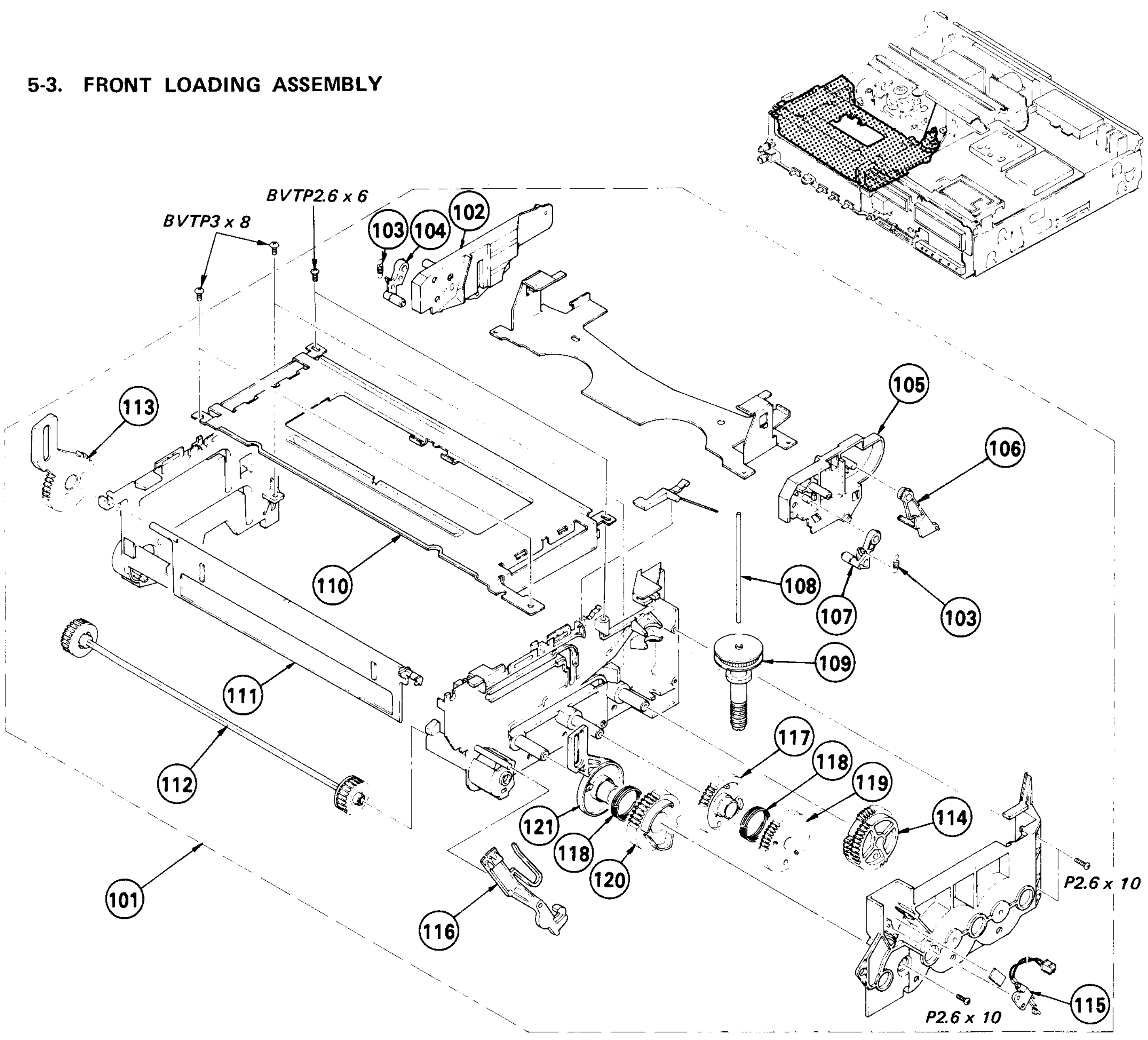
5-2. TUNER, TIMER AND POWER ASSEMBLIES



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
51	⚠.1-448-187-11	TRANSFORMER, POWER (T901)	
52	*A-6729-228-A	PS-70 BOARD, COMPLETE (EC MODEL)	
	*A-6729-231-A	PS-70 BOARD, COMPLETE (AS MODEL)	
53	⚠.1-551-732-11	CORD, POWER (AS MODEL)	
	⚠.1-551-908-41	CORD, POWER (EC MODEL)	
54	⚠.3-703-244-00	BUSHING (2104), CORD	
55	*1-616-741-11	PS-71 BOARD	
56	*1-616-742-11	PS-78 BOARD	
57	*3-701-832-00	HINGE, CIRCUIT BOARD	
58	X-3696-103-1	COVER ASSY, ORESET	
59	⚠.1-463-557-31	TUNER, ET (BT883AD)	
60	*A-6721-252-A	TU-73 BOARD, COMPLETE	
61	⚠.1-464-479-11	BOOSTER MIXER, RF MODULATOR (RFU827)	(EC MODEL)
	⚠.1-464-551-11	BOOSTER MIXER, RF MODULATOR (RFU841)	(AS MODEL)
62	*3-681-170-00	HEAT SINK, S	
63	*A-6715-282-A	SA-9 BOARD, COMPLETE (EC MODEL)	
	*A-6715-284-A	SA-9 BOARD, COMPLETE (AS MODEL)	
64	*A-6713-240-A	AF-7 BOARD, COMPLETE	
65	*3-684-087-01	CASE (S) MAIN, SHIELD, AF	
66	*3-684-072-01	LID, BOTTOM, AF SHIELD CASE (S)	
67	*A-6711-676-A	RY-4 BOARD, COMPLETE (EC MODEL)	
	*A-6711-678-A	RY-4 BOARD, COMPLETE (AS MODEL)	
68	3-670-155-11	LEG	
69	*A-6725-487-A	TM-80 BOARD, COMPLETE	
70	*1-616-794-11	HP-14 BOARD	
71	*A-6717-410-A	FU-37 BOARD, COMPLETE	
72	3-696-103-01	KNOB, HP	
73	3-696-106-01	KNOB, SLIDE	
74	3-696-105-02	KNOB, TRACK CONTROL	
75	3-696-111-01	BUTTON, BILIGUAL	
76	*3-696-170-01	PLATE, BLIND, CATCHER, RAY	
77	*A-6724-486-A	RS-12 BOARD, COMPLETE	
78	3-696-130-01	KNOB (RIGHT), REC SLIDE	
79	3-696-134-01	KNOB (LEFT), REC SLIDE	
80	3-696-131-01	SCALE, DIAL, REC SLIDE	
81	*A-6725-485-A	TM-79 BOARD, COMPLETE	
82	*4-313-732-00	CLIP, HINGE, CIRCUIT BOARD	

5-3. FRONT LOADING ASSEMBLY


BVTP2.6 x 6
BVTP3 x 8
103
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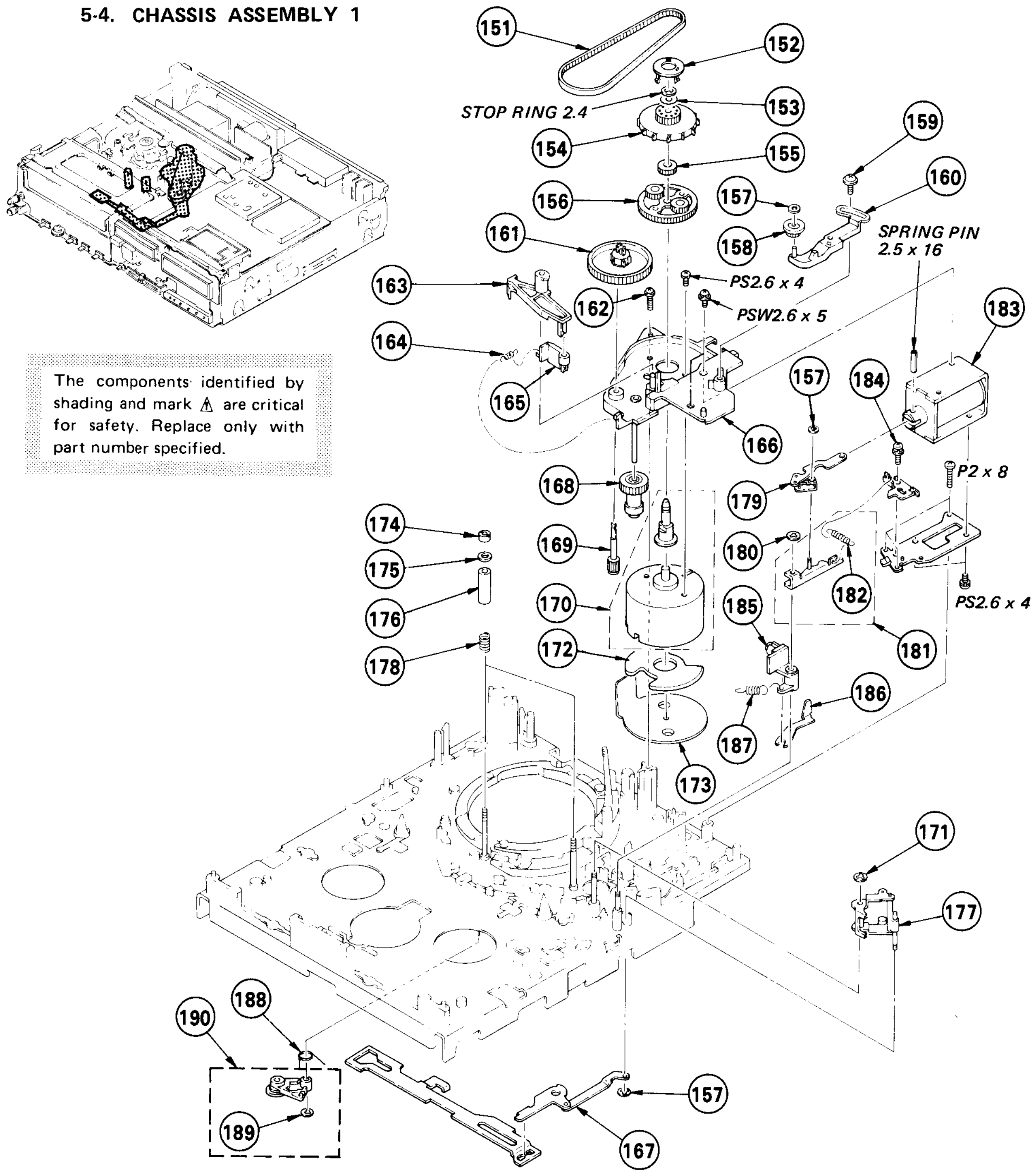
112
121
118
120
P2.6 x 10
101
116
P2.6 x 10
115

No.	Part No.	Description	Remark
101	*A-6751-267-A	THREADING BLOCK ASSY, FRONT	102-121
102	*X-3684-117-1	PLATE ASSY, SIDE, BASE (LEFT)	
103	3-684-258-01	SPRING, TENSION	
104	X-3684-125-1	RETAINER (LEFT) ASSY, CASSETTE	
105	*X-3684-118-1	PLATE ASSY, SIDE, RIGHT	
106	*3-684-108-01	ARM, LID OPEN	
107	X-3684-124-1	RETAINER (RIGHT) ASSY, CASSETTE	
108	3-679-123-00	SHAFT, GEAR, WORM	
109	3-684-164-01	GEAR, WORM	
110	*3-684-195-01	PLATE, TOP	
111	X-3696-106-1	DOOR ASSY	
112	X-3684-116-1	SHAFT ASSY, MIDWAY GEAR	
113	*3-684-166-01	ARM (LEFT), DRIVING	
114	X-3684-123-1	GEAR ASSY, DRIVING	
115	1-554-840-11	SWITCH, LEAF (CASSETTE ON) (S904)	
116	*3-693-854-01	ARM, SWITCHING, DOOR	
117	3-684-111-01	GEAR (B), LIMITER	
118	3-684-115-01	SPRING	
119	3-684-109-01	GEAR (A), LIMITER	
120	3-684-163-01	GEAR, DRIVING ARM	
121	3-684-165-01	ARM (RIGHT), DRIVING	

5-4. CHASSIS ASSEMBLY 1


151
152
STOP RING 2.4
153
154
155
156
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158
159
160
SPRING PIN 2.5 x 16
161
162
163
PS2.6 x 4
PSW2.6 x 5
164
165
166
183
157
184
P2 x 8
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170
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181
PS2.6 x 4
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173
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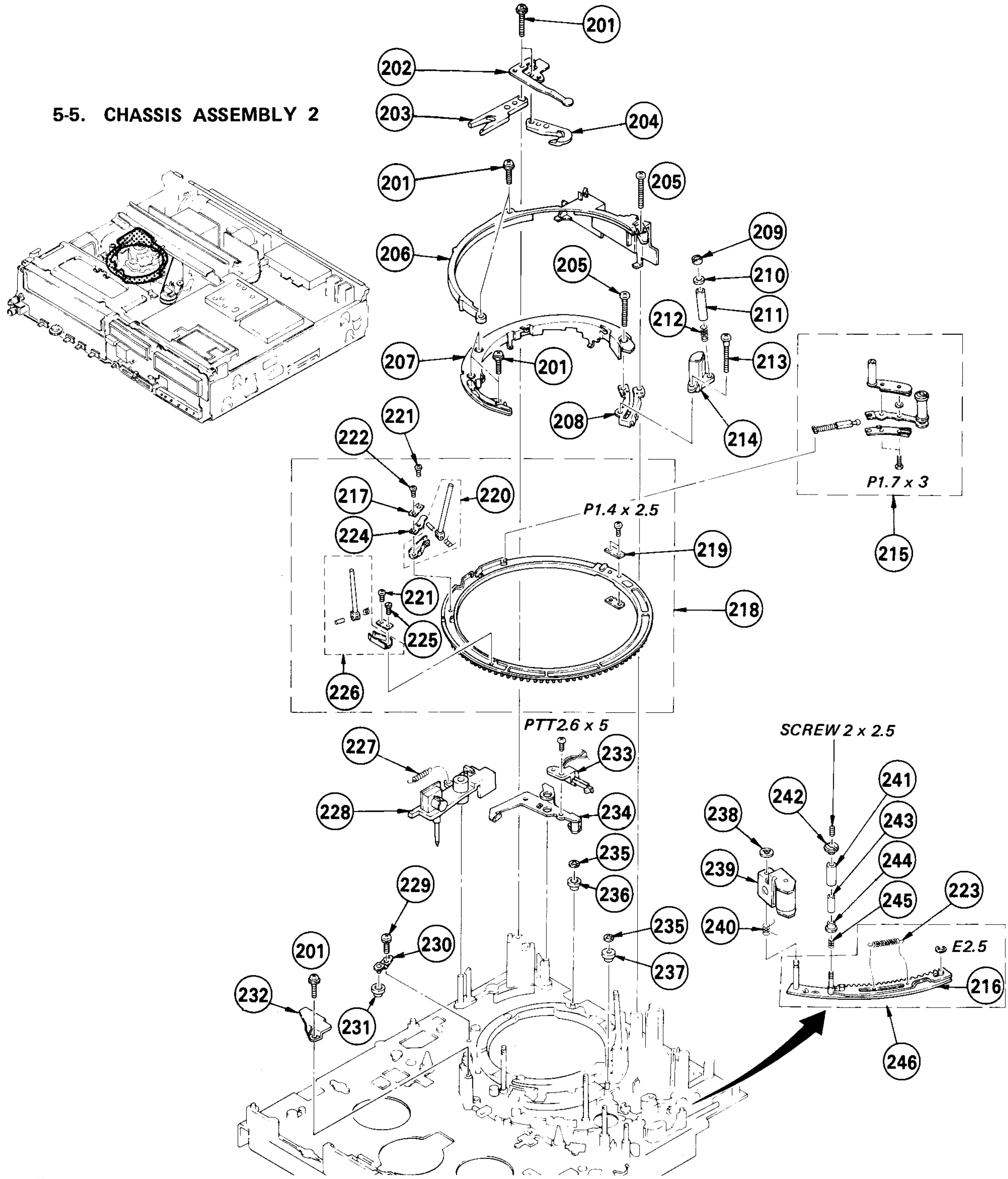
167

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
151	3-684-264-01	BELT, TIMING	
152	3-684-152-01	FLANGE, INTERNAL GEAR	
153	3-683-454-01	WASHER, POLYETHYLENE	
154	3-684-178-01	GEAR, INTERNAL	
155	3-679-104-05	GEAR	
156	X-3679-111-0	CARRIER ASSY	
157	3-669-465-00	WASHER (1.5), STOPPER	
158	3-684-151-02	GEAR	
159	3-681-231-00	SCREW (+PW 2.6X8), TAPPING	
160	*3-682-047-01	HOLDER (A), PC BOARD	
161	3-679-115-00	GEAR (LARGE), LOADING	
162	3-669-480-11	+ PTPWH 2	
163	3-684-167-01	ARM, STOPPER	
164	3-684-227-01	SPRING, TENSION	
165	3-684-116-01	LIMITER, STOPPER	
166	X-3684-129-1	CHASSIS ASSY, PLANET GEAR	
167	*X-3684-114-1	LEVER ASSY, COMMUNICATION	
168	X-3669-321-0	GEAR (C) ASSY	
169	3-679-114-00	GEAR (SMALL), LOADING	
170	X-3679-268-1	MOTOR ASSY, L (LOADING/THREADING)	(M904)
171	3-669-596-00	WASHER (2.3), STOPPER	
172	*1-605-071-00	LM-8 BOARD	
173	*3-669-613-00	INSULATOR, L MOTOR	
174	3-669-318-21	NUT, ADJUSTMENT, GUIDE	
175	3-684-135-01	WASHER (UPPER), GUIDE, #7, 8	
176	3-684-133-01	SLEEVE, GUIDE, #7, 8	
177	X-3684-113-1	ARM ASSY, PINCH PRESS	
178	3-684-290-01	SPRING, COMPRESSION	
179	X-3684-109-1	ARM ASSY, PINCH SOLENOID	
180	3-669-595-00	WASHER (2), STOPPER	
181	*X-3684-112-1	ARM ASSY, PINCH LIMITER	
182	3-515-170-00	SPRING, TENSION	
183	⚠.1-454-349-61	SOLENOID, PLUNGER (PINCH) (PM901)	
184	3-669-607-00	+PSW (SMALL ROUND) 2.6	
185	1-464-491-21	SENSOR, T COIL (TAKE-UP SENSOR) (L902)	
186	*3-684-119-01	LINK, TAKE-UP SENSOR	
187	3-684-157-04	SPRING (T SENSOR), TENSION	
188	3-681-154-00	SPRING, TORSION	
189	3-701-436-11	WASHER, 1.6	
190	X-3687-503-1	ARM ASSY, REVIEW BRAKE	

5-5. CHASSIS ASSEMBLY 2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P1.4 x 2.5
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218
225
226
P1.7 x 3
215
PTT2.6 x 5
SCREW 2 x 2.5
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233
228
234
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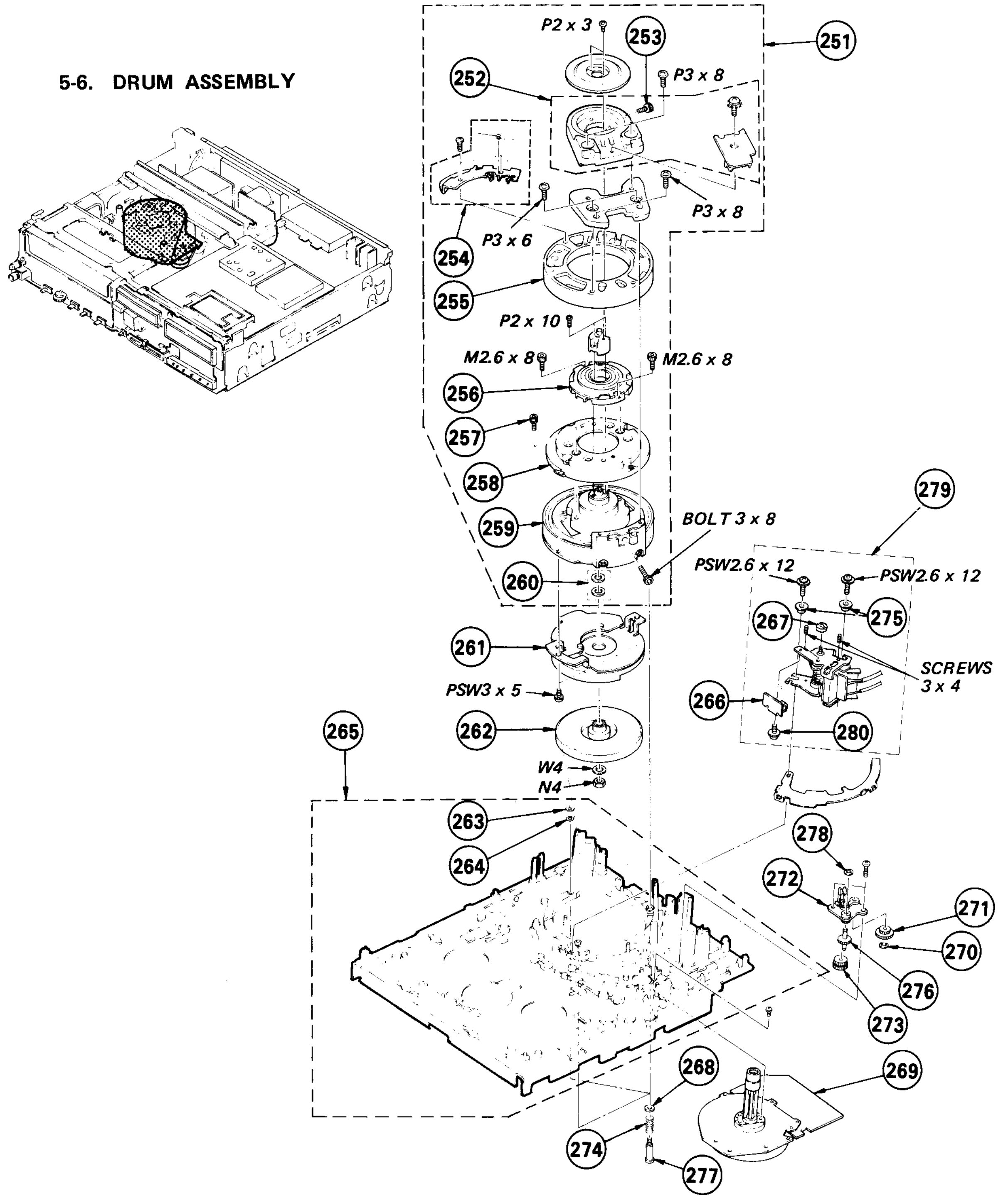
245
223
E2.5
216
246

No.	Part No.	Description	Remark
201	3-669-480-11	+ PTPWH 2	
202	*3-684-158-01	PLATE, GROUND TAPE GUIDE	
203	*3-669-618-00	PLATE (2), ADJUST	
204	*3-672-507-00	PLATE (3-1), ADJUSTMENT	
205	3-669-466-21	SCREW (M 2.6)	
206	3-684-217-04	GUIDE (2), SHUTTLE	
207	*3-679-290-00	GUIDE (1-YA), SHUTTLE	
208	*X-3679-263-1	BASE ASSY, SLANT	
209	3-669-446-00	NUT, GUIDE, NO. 6	
210	3-679-910-00	FLANGE (S), GUIDE, NUMBER 6	
211	3-669-445-00	SPACER, GUIDE, NO. 6	
212	3-669-615-00	SPRING, COMPRESSION	
213	3-669-606-00	SCREW (2.6)	
214	8-825-508-10	HEAD, FE (FULL ERACE HEAD)	
215	A-6750-158-B	SHUTTLE (2) BLOCK ASSY	
216	*X-3679-265-1	SLIDER ASSY (2), T	
217	*3-669-472-02	RETAINER, SPRING, LEAF	
218	X-3684-178-1	RING (CF) ASSY, THREADING, S	217
218			219-222, 224-226
219	*3-669-616-00	RETAINER	
220	*X-3669-430-0	HOLDER BLOCK ASSY, #3 GUIDE	
221	3-669-478-00	SCREW (1X3), TAPPING	
222	3-669-479-11	SCREW (1.4X3.5), TAPPING	
223	3-549-014-00	SPRING, TENSION	
224	3-672-583-00	SPRING	
225	3-672-586-00	SCREW (1.4X3), TAPPING	
226	*X-3669-429-0	HOLDER BLOCK ASSY, #2 GUIDE	
227	3-684-161-01	SPRING (S SENSOR), TENSION	
228	1-464-503-21	SENSOR, S COIL (SUPPLY SENSOR) (L901)	
229	3-669-607-31	+PSW (SMALL ROUND) (2.6)	
230	*X-3669-329-0	PLATE ASSY, ADJUSTMENT	
231	3-669-360-00	ROLLER, RING	
232	3-669-476-04	PLATE, GUIDE	
233	1-554-840-11	SWITCH, LEAF (THREADING END) (S903)	
234	*X-3684-130-1	ARM ASSY, LOCK	
235	3-669-465-00	WASHER (1.5), STOPPER	
236	3-669-630-00	ROLLER (C), RING	
237	3-669-597-00	ROLLER (B), RING	
238	3-669-596-00	WASHER (2.3), STOPPER	
239	X-3679-264-1	ARM ASSY, PINCH ROLLER	
240	3-683-441-01	SPRING	
241	3-676-649-11	ROLLER (#9), GUIDE	
242	3-676-650-00	FLANGE (UPPER) (#9), GUIDE	
243	3-672-559-00	SLEEVE, GUIDE	
244	3-672-558-00	FLANGE (LOWER) (#9), GUIDE	
245	3-669-452-00	SPRING, COMPRESSION	
246	A-6750-165-A	GEAR ASSY, SLIDER	216, 223

5-6. DRUM ASSEMBLY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P2 x 3
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252
P3 x 8
P3 x 8
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P3 x 6
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P2 x 10
M2.6 x 8
M2.6 x 8
256
257
258
279
259
BOLT 3 x 8
PSW2.6 x 12
PSW2.6 x 12
260
267
275
261
SCREWS
3 x 4
PSW3 x 5
266
265
262
280
W4
N4
263
264
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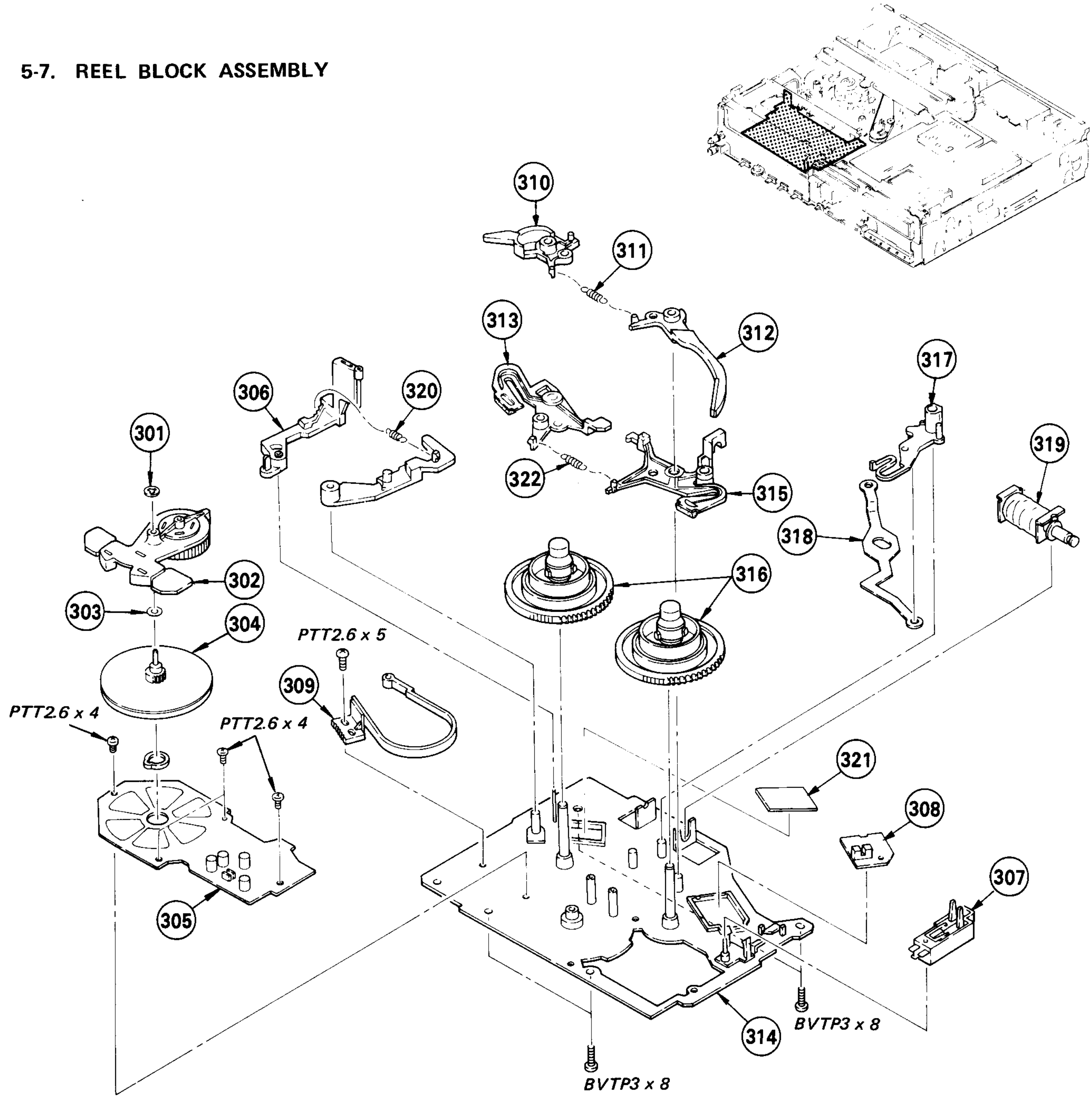
277

No.	Part No.	Description	Remark
251	A-6050-333-A	DRUM ASSY (DSH-64A-R)	252-260
252	A-6050-237-B	ARM ASSY, GUIDE	
253	3-681-360-01	BOLT, HEX, SOCKET (WASHER) 2.6X8	
254	A-6760-066-B	SPRING ASSY	
255	A-6760-178-A	DRUM UPPER	
256	X-3681-312-1	ROTARY COUPLER ASSY	
257	3-669-157-00	BOLT (WASHER) 2.6X8	
258	A-6762-226-A	DISK ASSY (DSR-64-R)	
259	A-6050-341-A	DRUM SUB ASSY (DSH-64A)	
260	X-3669-106-1	DAMPER ASSY	
261	X-2621-204-0	STATOR ASSY, D	
262	X-2621-202-0	ROTOR ASSY, D	
263	3-669-646-00	SPACER, DRUM	
264	3-669-646-11	SPACER, DRUM	
265	*X-3687-505-6	CHASSIS ASSY, MECHANICAL	259, 260
266	3-693-895-01	PROTECTOR (S)	
267	*3-684-246-02	NUT, ADJUSTMENT, HEIGHT, ACE	
268	3-669-600-11	WASHER, FLAT (3.5)	
269	8-838-071-01	MOTOR, DC(BHF-1909C)(CAPSTAN MOTOR)(M902)	
270	3-669-465-00	WASHER (1.5), STOPPER	
271	3-669-337-00	GEAR (D)	
272	X-3679-147-0	CHASSIS (B) ASSY, DRIVE GEAR	
273	3-669-338-00	GEAR (E)	
274	3-429-123-00	SPRING	
275	3-684-247-01	BUSHING, ACE	
276	X-3679-148-0	GEAR (F) ASSY (D)	
277	3-669-302-00	SCREW, FITTING	
278	3-669-595-00	WASHER (2), STOPPER	
279	A-6761-103-A	ACE ASSY	266, 267, 275, 280
280	3-693-439-11	SCREW (P2.6X5), (+)	

5-7. REEL BLOCK ASSEMBLY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PTT2.6 x 5
309
PTT2.6 x 4
PTT2.6 x 4
321
308
307
305
314
BVTP3 x 8
BVTP3 x 8

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
301	3-669-595-00	WASHER (2), STOPPER	
302	A-6759-074-A	ARM BLOCK ASSY, PENDULUM	
303	3-679-318-00	WASHER, PENDULUM ARM	
304	X-2622-201-0	ROTOR ASSY, R	
305	*A-4910-049-A	R STATOR(REEL MOTOR)BOARD, COMPLETE(M903)	
306	X-3684-121-1	LEVER ASSY, TENSION REGULATOR	
307	1-554-839-11	SWITCH, LEAF (2 GANG) (REC PROOF, CASSETTE DOWN) (S901)	
308	*1-613-233-11	RD-21 BOARD	
309	X-3679-120-0	BAND ASSY, TENSION REGULATOR	
310	3-684-192-01	ARM, BRAKE, SUPPLY SOFT	
311	3-684-235-01	SPRING, TENSION	
312	X-3684-137-1	BRAKE ASSY, T SOFT	
313	X-3684-107-1	BRAKE ASSY, SUPPLY	
314	*X-3684-131-1	CHASSIS ASSY, SUB	
315	X-3684-108-1	BRAKE ASSY, TAKE-UP	
316	X-3684-106-1	TABLE ASSY, REEL	
317	3-684-193-01	ARM, PENDULUM STOPPER	
318	*3-684-183-01	LINK, L	
319 ⚠	1-454-371-31	SOLENOID, PLUNGER (BRAKE) (PM902)	
320	3-679-151-00	SPRING, TORSION	
321	*1-613-232-11	RD-20 BOARD	
322	3-685-772-01	SPRING, TENSION	

5-8. HARDWARE LIST

SET-SCREW

7-621-731-08	SET-SCT, HEX. 2X2.5, FLAT POINT
7-621-732-08	SET-SCT, HEX. 2X3 FLAT POINT
7-683-174-21	SET-SCREW, SLOT 3X4 CONE POINT

SCREW

7-621-759-85	+PSW, 2.6X12
7-621-773-86	SCREW +B 2.6X4
7-627-552-38	SCREW, PRECISION +P 1.7X3
7-627-553-58	SCREW, PRECISION +P 2X4.5
7-627-554-07	SCREW, PRECISION +P 2X2.2
7-628-253-15	SCREW +PS 2X5
7-628-253-95	SCREW +PS 2.6X4
7-628-254-15	SCREW +PS 2.6X6
7-682-151-01	SCREW +P 3X14
7-685-134-14	SCREW +P 2.6X8 TYPE2 NON-SLIT
7-685-135-14	SCREW +P 2.6X10 TYPE2 NON-SLIT
7-685-645-71	SCREW +BVTP 3X6 TYPE2 IT-3
7-685-645-81	SCREW +BVTP 3X6 TYPE2
7-685-646-71	SCREW +BVTP 3X8 TYPE2 IT-3
7-685-646-81	SCREW +BVTP 3X8 TYPE2
7-685-790-04	SCREW +PTT 2.6X4 (S)
7-685-791-04	SCREW +PTT 2.6X5 (S)
7-685-791-04	SCREW +BVTT 2.6X5 (S)

RING

7-624-118-01	RING, RETAINING E-2.5
7-624-190-61	STOP RING 2.4, TYPE-CS

TAPPING

7-685-105-14	TPG +P 2X8, TYPE 2, NON-SLIT

SECTION 6

ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- MF : μF, PF : μμF

COILS

- MMH : mH, UH : μH

Ref.No	Part No.	Description				Remark
	*A-4910-049-A	R STATOR (REEL MOTOR) BOARD, COMPLETE				
		**************************************				
	*1-560-460-00	PIN, CONNECTOR 4P				
		CAPACITOR				
C1	1-123-821-00	ELECT	47MF	20%	16V	
C2	1-123-821-00	ELECT	47MF	20%	16V	
C3	1-123-821-00	ELECT	47MF	20%	16V	
C4	1-123-821-00	ELECT	47MF	20%	16V	
		DIODE				
D1	8-719-941-48	DIODE 1N4148TP				
		IC				
IC1	8-759-108-77	IC CX-877				
		TRANSISTOR				
Q1	8-729-100-01	TRANSISTOR 2SD992-N				
Q2	8-729-100-01	TRANSISTOR 2SD992-N				
Q3	8-729-100-01	TRANSISTOR 2SD992-N				
Q4	8-729-100-01	TRANSISTOR 2SD992-N				
Q5	8-729-100-01	TRANSISTOR 2SD992-N				
Q6	8-729-100-01	TRANSISTOR 2SD992-N				
		RESISTOR				
R1	1-247-823-00	CARBON	470	5%	1/6W	
R2	1-247-823-00	CARBON	470	5%	1/6W	
R3	1-247-823-00	CARBON	470	5%	1/6W	
R4	1-247-829-00	CARBON	820	5%	1/6W	
R5	1-247-871-00	CARBON	47K	5%	1/6W	
R6	1-247-871-00	CARBON	47K	5%	1/6W	
R7	1-247-871-00	CARBON	47K	5%	1/6W	
R8	1-247-871-00	CARBON	47K	5%	1/6W	
		DIODE				
S1	8-719-810-31	DIODE THS103-1				
S2	8-719-810-31	DIODE THS103-1				
******	******	******	******	******	******	******
	*A-6711-676-A	RY-4 BOARD, COMPLETE (EC MODEL)				
		*********************************				
	*A-6711-678-A	RY-4 BOARD, COMPLETE (AS MODEL)				
		*********************************				
		CAPACITOR				
C010	1-123-356-00	ELECT	10MF	20%	16V	
C013	1-123-306-00	ELECT	47MF	20%	10V	(EC MODEL)
C014	1-123-369-00	ELECT	4.7MF	20%	25V	(EC MODEL)
C015	1-123-306-00	ELECT	47MF	20%	10V	(EC MODEL)
C016	1-108-589-00	MYLAR	0.027MF	5%	50V	(EC MODEL)
C017	1-101-004-00	CERAMIC	0.01MF		50V	(EC MODEL)
C018	1-123-306-00	ELECT	47MF	20%	10V	(EC MODEL)
C019	1-101-004-00	CERAMIC	0.01MF		50V	(EC MODEL)
C020	1-101-004-00	CERAMIC	0.01MF		50V	
C021	1-101-004-00	CERAMIC	0.01MF		50V	
C023	1-101-882-00	CERAMIC	51PF	5%	50V	
C024	1-130-047-00	FILM	180PF	5%	50V	
C025	1-106-172-00	MYLAR	0.001MF	5%	50V	
C026	1-101-059-00	CERAMIC	510PF	5%	50V	
C027	1-161-045-00	CERAMIC	0.0033MF	10%	25V	
C028	1-106-172-00	MYLAR	0.001MF	5%	50V	
C029	1-123-382-00	ELECT	3.3MF	20%	50V	
C032	1-102-816-00	CERAMIC	120PF	5%	50V	
C033	1-101-004-00	CERAMIC	0.01MF		50V	
C034	1-101-004-00	CERAMIC	0.01MF		50V	
C035	1-102-816-00	CERAMIC	120PF	5%	50V	
C036	1-101-882-00	CERAMIC	51PF	5%	50V	
C037	1-101-004-00	CERAMIC	0.01MF		50V	
C038	1-101-004-00	CERAMIC	0.01MF		50V	
C039	1-101-004-00	CERAMIC	0.01MF		50V	
C041	1-161-043-00	CERAMIC	0.0022MF	10%	25V	
C042	1-102-516-00	CERAMIC	27PF	5%	50V	(EC MODEL)
C043	1-101-004-00	CERAMIC	0.01MF		50V	(EC MODEL)
C044	1-101-004-00	CERAMIC	0.01MF		50V	(EC MODEL)
C045	1-102-523-00	CERAMIC	56PF	5%	50V	(EC MODEL)
C046	1-101-004-00	CERAMIC	0.01MF		50V	(EC MODEL)
C047	1-101-006-00	CERAMIC	0.047MF		50V	
C048	1-101-004-00	CERAMIC	0.01MF		50V	(EC MODEL)
C049	1-101-004-00	CERAMIC	0.01MF		50V	
C050	1-102-865-00	CERAMIC	8PF	0.5PF	50V	
C051	1-102-525-00	CERAMIC	68PF	5%	50V	
C052	1-102-525-00	CERAMIC	68PF	5%	50V	
C053	1-123-380-00	ELECT	1MF	20%	50V	
C054	1-161-040-00	CERAMIC	0.0012MF	10%	25V	
C055	1-123-380-00	ELECT	1MF	20%	50V	
C056	1-102-963-00	CERAMIC	33PF	5%	50V	
C057	1-102-980-00	CERAMIC	270PF	5%	50V	
C058	1-123-306-00	ELECT	47MF	20%	10V	
C059	1-101-004-00	CERAMIC	0.01MF		50V	
C060	1-108-579-00	MYLAR	0.01MF	5%	50V	
C061	1-123-382-00	ELECT	3.3MF	20%	50V	
C062	1-123-306-00	ELECT	47MF	20%	10V	
C063	1-101-004-00	CERAMIC	0.01MF		50V	
C064	1-102-521-00	CERAMIC	43PF	5%	50V	
C065	1-102-527-00	CERAMIC	82PF	5%	50V	
C066	1-102-518-00	CERAMIC	33PF	5%	50V	
C068	1-101-004-00	CERAMIC	0.01MF		50V	
C069	1-102-962-00	CERAMIC	30PF	5%	50V	
C070	1-101-004-00	CERAMIC	0.01MF		50V	
C071	1-123-380-00	ELECT	1MF	20%	50V	
C072	1-101-004-00	CERAMIC	0.01MF		50V	
C073	1-102-525-00	CERAMIC	68PF	5%	50V	
C074	1-102-525-00	CERAMIC	68PF	5%	50V	

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Ref.No	Part No.	Description			Remark
C075	1-101-004-00	CERAMIC	0.01MF		50V
C076	1-102-951-00	CERAMIC	15PF	5%	50V
C077	1-123-330-00	ELECT	22MF	20%	16V
C078	1-123-330-00	ELECT	22MF	20%	16V
C080	1-101-004-00	CERAMIC	0.01MF		50V
C082	1-161-024-00	CERAMIC	0.082MF	10%	25V
C083	1-102-977-00	CERAMIC	200PF	5%	50V
C084	1-123-369-00	ELECT	4.7MF	20%	25V
C085	1-101-004-00	CERAMIC	0.01MF		50V
C086	1-108-557-00	MYLAR	0.0012MF	5%	50V
C087	1-161-057-00	CERAMIC	0.033MF	10%	25V
C088	1-101-361-00	CERAMIC	150PF	5%	50V
C092	1-101-004-00	CERAMIC	0.01MF		50V
C093	1-101-006-00	CERAMIC	0.047MF		50V
C095	1-102-976-00	CERAMIC	180PF	5%	50V
C096	1-102-824-00	CERAMIC	470PF	5%	50V
C097	1-102-823-00	CERAMIC	430PF	5%	50V
C098	1-102-820-00	CERAMIC	330PF	5%	50V
C099	1-102-520-00	CERAMIC	39PF	5%	50V
C100	1-102-852-00	CERAMIC	47PF	5%	50V
C101	1-108-595-00	MYLAR	0.047MF	5%	50V
C102	1-161-043-00	CERAMIC	0.0022MF	10%	25V
C103	1-106-172-00	MYLAR	0.001MF	5%	50V
C104	1-102-977-00	CERAMIC	200PF	5%	50V
C105	1-102-973-00	CERAMIC	100PF	5%	50V
C106	1-123-356-00	ELECT	10MF	20%	16V
C107	1-161-025-00	CERAMIC	0.1MF	10%	25V
C108	1-101-004-00	CERAMIC	0.01MF		50V
C111	1-102-973-00	CERAMIC	100PF	5%	50V
C112	1-101-004-00	CERAMIC	0.01MF		50V
C113	1-101-006-00	CERAMIC	0.047MF		50V
C114	1-101-361-00	CERAMIC	150PF	5%	50V
C116	1-101-004-00	CERAMIC	0.01MF		50V
C117	1-101-361-00	CERAMIC	150PF	5%	50V
C120	1-101-004-00	CERAMIC	0.01MF		50V
C121	1-101-004-00	CERAMIC	0.01MF		50V
C122	1-101-004-00	CERAMIC	0.01MF		50V
C123	1-101-004-00	CERAMIC	0.01MF		50V
C124	1-102-948-00	CERAMIC	11PF	5%	50V
C125	1-123-330-00	ELECT	22MF	20%	16V
C127	1-123-318-00	ELECT	33MF	20%	16V
C128	1-123-330-00	ELECT	22MF	20%	16V
C129	1-123-369-00	ELECT	4.7MF	20%	25V
C130	1-123-356-00	ELECT	10MF	20%	16V
C131	1-123-380-00	ELECT	1MF	20%	50V
C132	1-123-369-00	ELECT	4.7MF	20%	25V
C133	1-102-851-00	CERAMIC	15PF	5%	50V
C134	1-102-821-00	CERAMIC	360PF	5%	50V
C135	1-102-823-00	CERAMIC	430PF	5%	50V
C136	1-102-976-00	CERAMIC	180PF	5%	50V
C137	1-102-513-00	CERAMIC	18PF	5%	50V
C138	1-102-529-00	CERAMIC	100PF	5%	50V
C139	1-102-529-00	CERAMIC	100PF	5%	50V
C140	1-102-519-91	CERAMIC	36PF	5%	50V
C142	1-123-369-00	ELECT	4.7MF	20%	25V
C144	1-102-511-00	CERAMIC	13PF	5%	50V
C145	1-102-522-00	CERAMIC	51PF	5%	50V
C146	1-102-522-00	CERAMIC	51PF	5%	50V
C147	1-102-511-00	CERAMIC	13PF	5%	50V
C148	1-101-006-00	CERAMIC	0.047MF		50V
C155	1-101-004-00	CERAMIC	0.01MF		50V
C156	1-101-004-00	CERAMIC	0.01MF		50V
C157	1-102-981-00	CERAMIC	300PF	5%	50V
C158	1-102-948-00	CERAMIC	11PF	5%	50V
C159	1-102-822-00	CERAMIC	390PF	5%	50V
C178	1-123-330-00	ELECT	22MF	20%	16V
C179	1-123-356-00	ELECT	10MF	20%	16V
C180	1-123-332-00	ELECT	47MF	20%	16V
C181	1-106-186-00	MYLAR	0.0039MF	5%	50V
C182	1-123-380-00	ELECT	1MF	20%	50V
C183	1-101-006-00	CERAMIC	0.047MF		50V
C184	1-123-332-00	ELECT	47MF	20%	16V
C191	1-101-004-00	CERAMIC	0.01MF		50V
C192	1-123-369-00	ELECT	4.7MF	20%	25V
C196	1-123-380-00	ELECT	1MF	20%	50V
C197	1-123-356-00	ELECT	10MF	20%	16V
C200	1-101-004-00	CERAMIC	0.01MF		50V
C201	1-123-356-00	ELECT	10MF	20%	16V
C203	1-101-004-00	CERAMIC	0.01MF		50V
C204	1-123-369-00	ELECT	4.7MF	20%	25V
C206	1-101-004-00	CERAMIC	0.01MF		50V
C207	1-161-025-00	CERAMIC	0.1MF	10%	25V
C208	1-123-356-00	ELECT	10MF	20%	16V
C212	1-123-333-00	ELECT	100MF	20%	16V
C217	1-101-006-00	CERAMIC	0.047MF		50V
C219	1-123-356-00	ELECT	10MF	20%	16V
C220	1-101-006-00	CERAMIC	0.047MF		50V
C232	1-101-004-00	CERAMIC	0.01MF		50V (AS MODEL)
C233	1-123-352-00	ELECT	1MF	20%	50V (AS MODEL)
C246	1-161-025-00	CERAMIC	0.1MF	10%	25V
C248	1-101-006-00	CERAMIC	0.047MF		50V
C251	1-101-006-00	CERAMIC	0.047MF		50V
C252	1-102-816-00	CERAMIC	120PF	5%	50V
C253	1-123-356-00	ELECT	10MF	20%	16V
C257	1-101-006-00	CERAMIC	0.047MF		50V
C300	1-101-004-00	CERAMIC	0.01MF		50V (EC MODEL)
C301	1-101-006-00	CERAMIC	0.047MF		50V
C302	1-102-773-00	CERAMIC	330PF	5%	50V
C303	1-130-479-00	MYLAR	0.0047MF	5%	50V
C304	1-123-330-00	ELECT	22MF	20%	16V
C401	1-123-381-00	ELECT	2.2MF	20%	50V
C402	1-101-001-00	CERAMIC	0.001MF		50V
C403	1-101-001-00	CERAMIC	0.001MF		50V
C404	1-101-004-00	CERAMIC	0.01MF		50V
C405	1-123-330-00	ELECT	22MF	20%	16V
C406	1-123-330-00	ELECT	22MF	20%	16V

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C407	1-102-962-00	CERAMIC	30PF	5%	50V
C408	1-101-888-00	CERAMIC	68PF	5%	50V
C409	1-123-381-00	ELECT	2.2MF	20%	50V
C410	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C411	1-101-005-00	CERAMIC	0.022MF		50V
C412	1-123-318-00	ELECT	33MF	20%	16V
C414	1-123-356-00	ELECT	10MF	20%	16V
C415	1-123-369-00	ELECT	4.7MF	20%	25V
C416	1-102-948-00	CERAMIC	11PF	5%	50V
C417	1-102-948-00	CERAMIC	11PF	5%	50V
C418	1-102-965-00	CERAMIC	39PF	5%	50V
C419	1-123-356-00	ELECT	10MF	20%	16V
C420	1-123-369-00	ELECT	4.7MF	20%	25V
C421	1-101-006-00	CERAMIC	0.047MF		50V
C501	1-101-004-00	CERAMIC	0.01MF		50V (EC MODEL)
C502	1-101-004-00	CERAMIC	0.01MF		50V
C503	1-101-004-00	CERAMIC	0.01MF		50V
C504	1-101-005-00	CERAMIC	0.022MF		50V
C505	1-102-822-00	CERAMIC	390PF	5%	50V
C506	1-101-006-00	CERAMIC	0.047MF		50V
C507	1-123-318-00	ELECT	33MF	20%	16V
C613	1-101-004-00	CERAMIC	0.01MF		50V (EC MODEL)
C703	1-101-004-00	CERAMIC	0.01MF		50V
C704	1-123-356-00	ELECT	10MF	20%	16V
C705	1-123-379-00	ELECT	0.47MF	20%	50V
C706	1-108-603-00	MYLAR	0.1MF	5%	50V
C707	1-123-356-00	ELECT	10MF	20%	16V
C708	1-101-004-00	CERAMIC	0.01MF		50V
C712	1-101-004-00	CERAMIC	0.01MF		50V
C713	1-102-820-00	CERAMIC	330PF	5%	50V
C714	1-123-356-00	ELECT	10MF	20%	16V
C717	1-102-973-00	CERAMIC	100PF	5%	50V
C718	1-102-973-00	CERAMIC	100PF	5%	50V
C719	1-102-824-00	CERAMIC	470PF	5%	50V
C720	1-102-120-00	CERAMIC	0.0018MF	10%	50V
C721	1-102-852-00	CERAMIC	47PF	5%	50V
C722	1-102-852-00	CERAMIC	47PF	5%	50V
C723	1-123-333-00	ELECT	100MF	20%	16V
C724	1-123-356-00	ELECT	10MF	20%	16V
C725	1-108-603-00	MYLAR	0.1MF	5%	50V
C726	1-123-379-00	ELECT	0.47MF	20%	50V
C727	1-123-356-00	ELECT	10MF	20%	16V
C728	1-101-004-00	CERAMIC	0.01MF		50V
C733	1-102-977-00	CERAMIC	200PF	5%	50V
C736	1-123-356-00	ELECT	10MF	20%	16V
C739	1-101-006-00	CERAMIC	0.047MF		50V
C740	1-101-004-00	CERAMIC	0.01MF		50V
C741	1-102-960-00	CERAMIC	24PF	5%	50V
C742	1-102-960-00	CERAMIC	24PF	5%	50V
C743	1-123-318-00	ELECT	33MF	20%	16V
C744	1-101-004-00	CERAMIC	0.01MF		50V
C745	1-102-514-00	CERAMIC	22PF	5%	50V
C746	1-101-004-00	CERAMIC	0.01MF		50V

Ref.No	Part No.	Description			Remark
C747	1-101-004-00	CERAMIC	0.01MF		50V
C748	1-101-004-00	CERAMIC	0.01MF		50V
C749	1-101-004-00	CERAMIC	0.01MF		50V
C750	1-101-004-00	CERAMIC	0.01MF		50V
C751	1-101-004-00	CERAMIC	0.01MF		50V
C753	1-101-004-00	CERAMIC	0.01MF		50V
C754	1-101-004-00	CERAMIC	0.01MF		50V
C755	1-101-004-00	CERAMIC	0.01MF		50V
C756	1-101-004-00	CERAMIC	0.01MF		50V
C757	1-123-356-00	ELECT	10MF	20%	16V
C761	1-102-128-00	CERAMIC	0.0082MF	10%	50V
C762	1-101-004-00	CERAMIC	0.01MF		50V
C801	1-123-356-00	ELECT	10MF	20%	16V
C803	1-101-004-00	CERAMIC	0.01MF		50V
C807	1-101-006-00	CERAMIC	0.047MF		50V
C808	1-161-025-00	CERAMIC	0.1MF	10%	25V
C809	1-101-004-00	CERAMIC	0.01MF		50V
C810	1-101-004-00	CERAMIC	0.01MF		50V
C811	1-101-004-00	CERAMIC	0.01MF		50V
C812	1-101-006-00	CERAMIC	0.047MF		50V
C813	1-101-004-00	CERAMIC	0.01MF		50V

FILTER

Ref.No	Part No.	Description
CF001	1-527-998-00	FILTER, CERAMIC (EC MODEL)
CF002	1-527-875-00	FILTER, CERAMIC
CF003	1-527-849-00	FILTER, CERAMIC

CONNECTOR

Ref.No	Part No.	Description
CN001	*1-564-030-00	PIN, CONNECTOR 5P
CN002	*1-564-032-00	PIN, CONNECTOR 7P
CN003	*1-564-027-00	PIN, CONNECTOR 2P
CN004	*1-564-029-00	PIN, CONNECTOR 4P
CN005	*1-564-029-00	PIN, CONNECTOR 4P
CN701	*1-560-894-00	PIN, CONNECTOR 6P
CN702	*1-564-030-00	PIN, CONNECTOR 5P

TRIMMER

Ref.No	Part No.	Description
CT001	1-141-275-00	CAP, TRIMMER

DIODE

Ref.No	Part No.	Description
D005	8-719-911-19	DIODE 1SS119 (EC MODEL)
D006	8-719-000-06	DIODE MC921 (EC MODEL)
D009	8-719-000-06	DIODE MC921 (EC MODEL)
D012	8-719-911-19	DIODE 1SS119 (EC MODEL)
D013	8-719-911-19	DIODE 1SS119 (EC MODEL)
D014	8-719-911-19	DIODE 1SS119
D015	8-719-911-19	DIODE 1SS119
D016	8-719-000-12	DIODE MC931
D017	8-719-911-19	DIODE 1SS119
D018	8-719-911-19	DIODE 1SS119
D019	8-719-911-19	DIODE 1SS119
D020	8-719-911-19	DIODE 1SS119

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
D021	8-719-911-19	DIODE 1SS119	
D022	8-719-911-19	DIODE 1SS119	
D023	8-719-911-19	DIODE 1SS119	
D025	8-719-911-19	DIODE 1SS119	
D027	8-719-000-06	DIODE MC921	
D029	8-719-100-56	DIODE RD10EB1	
D030	8-719-911-19	DIODE 1SS119	
D040	8-719-100-40	DIODE RD6.8EB1	
D701	8-719-901-33	DIODE 1SS133	
D702	8-719-901-33	DIODE 1SS133	
D802	8-719-911-19	DIODE 1SS119	
		DELAY LINE	
DL001	1-415-313-00	DELAY LINE, 1H	
DL401	1-415-352-11	DELAY LINE, 1H	
DL501	1-415-419-11	DELAY LINE	
		FILTER	
FL001	1-235-097-11	FILTER, LOW PASS	
FL002	1-235-098-00	FILTER, BAND PASS	
		IC	
IC001	8-759-909-20	IC BA634 (EC MODEL)	
IC002	8-759-904-95	IC BA7007 (EC MODEL)	
IC003	8-759-202-47	IC CX10023	
IC004	8-759-208-94	IC CX-894 (EC MODEL)	
IC005	8-752-006-10	IC CX20061 (EC MODEL)	
IC006	8-759-203-99	IC CX10021A-NP	
IC009	8-759-101-62	IC CX20043	
IC011	8-752-006-10	IC CX20061	
IC020	8-759-045-38	IC MC14538BCP	
IC401	8-758-662-00	IC CX-866B	
IC701	8-752-004-50	IC CX20045	
IC702	8-759-200-60	IC TA7060AP	
		COIL	
L001	1-410-450-11	MICRO INDUCTOR 3.9MMH	
L002	1-410-447-11	MICRO INDUCTOR 2.2MMH	
L003	1-408-408-00	MICRO INDUCTOR 8.2UH	
L004	1-408-406-00	MICRO INDUCTOR 5.6UH	
L005	1-408-415-00	MICRO INDUCTOR 33UH	
L006	1-408-428-00	MICRO INDUCTOR 390UH	
L007	1-408-427-00	MICRO INDUCTOR 330UH	
L008	1-408-421-00	MICRO INDUCTOR 100UH	
L010	1-408-427-00	MICRO INDUCTOR 330UH	
L011	1-408-423-00	MICRO INDUCTOR 150UH	
L012	1-408-409-00	MICRO INDUCTOR 10UH	
L014	1-408-422-00	MICRO INDUCTOR 120UH	
L015	1-408-419-00	MICRO INDUCTOR 68UH	
L016	1-408-413-00	MICRO INDUCTOR 22UH	
L017	1-408-423-00	MICRO INDUCTOR 150UH	
L018	1-408-419-00	MICRO INDUCTOR 68UH	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L019	1-408-421-00	MICRO INDUCTOR 100UH	
L021	1-408-422-00	MICRO INDUCTOR 120UH	
L022	1-408-424-00	MICRO INDUCTOR 180UH	
L023	1-408-422-00	MICRO INDUCTOR 120UH	
L026	1-408-416-00	MICRO INDUCTOR 39UH	
L036	1-408-429-00	MICRO INDUCTOR 470UH	
L041	1-408-424-00	MICRO INDUCTOR 180UH	
L401	1-408-397-00	MICRO INDUCTOR 1UH	
L402	1-408-397-00	MICRO INDUCTOR 1UH	
L501	1-408-408-00	MICRO INDUCTOR 8.2UH	
L502	1-408-423-00	MICRO INDUCTOR 150UH	
L701	1-408-876-00	MICRO INDUCTOR 0.18UH	
L702	1-408-427-00	MICRO INDUCTOR 330UH	
L703	1-408-429-00	MICRO INDUCTOR 470UH	
L706	1-408-421-00	MICRO INDUCTOR 100UH	
L709	1-408-422-00	MICRO INDUCTOR 120UH	
L710	1-408-411-00	MICRO INDUCTOR 15UH	
L711	1-408-411-00	MICRO INDUCTOR 15UH	
L712	1-408-878-00	MICRO INDUCTOR 0.33UH	
L713	1-408-427-00	MICRO INDUCTOR 330UH	
L716	1-408-429-00	MICRO INDUCTOR 470UH	
L717	1-408-415-00	MICRO INDUCTOR 33UH	
L720	1-407-495-00	MICRO INDUCTOR 1.8MMH	
L721	1-408-429-00	MICRO INDUCTOR 470UH	
L761	1-408-429-00	MICRO INDUCTOR 470UH	
		VARIABLE COIL	
LV001	1-407-291-00	MICRO INDUCTOR 15MMH (EC MODEL)	
LV002	1-408-532-00	COIL, VARIABLE (EC MODEL)	
LV003	1-408-513-00	COIL (VARIABLE) (EC MODEL)	
LV501	1-408-512-00	COIL (VARIABLE)	
		IC	
PS001 ⚠	1-532-685-00	LINK, IC	
		TRANSISTOR	
Q010	8-729-177-43	TRANSISTOR 2SD774	
Q011	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q014	8-729-113-33	TRANSISTOR 2SB733-4	
Q015	8-729-900-89	TRANSISTOR DTC144ES	
Q016	8-729-245-83	TRANSISTOR 2SC2458	
Q019	8-729-204-83	TRANSISTOR 2SA1048-GR (EC MODEL)	
Q020	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q021	8-729-245-83	TRANSISTOR 2SC2458 (EC MODEL)	
Q022	8-729-245-83	TRANSISTOR 2SC2458	
Q023	8-729-245-83	TRANSISTOR 2SC2458	
Q024	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q025	8-729-900-85	TRANSISTOR DTC144WS (EC MODEL)	
Q026	8-729-204-83	TRANSISTOR 2SA1048-GR (EC MODEL)	
Q027	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q028	8-729-245-83	TRANSISTOR 2SC2458	
Q029	8-729-245-83	TRANSISTOR 2SC2458 (EC MODEL)	
Q030	8-729-245-83	TRANSISTOR 2SC2458	

Ref.No	Part No.	Description			Remark
Q031	8-729-900-36	TRANSISTOR DTC124ES			
Q033	8-729-245-83	TRANSISTOR 2SC2458			
Q034	8-729-245-83	TRANSISTOR 2SC2458			
Q035	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q036	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q037	8-729-384-46	TRANSISTOR 2SA844-C			
Q038	8-729-384-46	TRANSISTOR 2SA844-C			
Q039	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q040	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q041	8-729-384-46	TRANSISTOR 2SA844-C			
Q042	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q048	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q049	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q050	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q051	8-729-384-46	TRANSISTOR 2SA844-C			
Q052	8-729-603-30	TRANSISTOR 2SC403SP-3			
Q053	8-729-384-46	TRANSISTOR 2SA844-C			
Q054	8-729-384-46	TRANSISTOR 2SA844-C			
Q056	8-729-245-83	TRANSISTOR 2SC2458			
Q060	8-729-204-83	TRANSISTOR 2SA1048-GR			
Q061	8-729-245-83	TRANSISTOR 2SC2458			
Q062	8-729-204-83	TRANSISTOR 2SA1048-GR			
Q064	8-729-245-83	TRANSISTOR 2SC2458			
Q068	8-729-245-83	TRANSISTOR 2SC2458			
Q070	8-729-245-83	TRANSISTOR 2SC2458			
Q071	8-729-245-83	TRANSISTOR 2SC2458			
Q076	8-729-204-83	TRANSISTOR 2SA1048-GR (AS MODEL)			
Q077	8-729-245-83	TRANSISTOR 2SC2458 (AS MODEL)			
Q080	8-729-245-83	TRANSISTOR 2SC2458			
Q100	8-729-900-85	TRANSISTOR DTC144WS			
Q103	8-729-245-83	TRANSISTOR 2SC2458			
Q401	8-729-245-83	TRANSISTOR 2SC2458			
Q501	8-729-245-83	TRANSISTOR 2SC2458			
Q502	8-729-245-83	TRANSISTOR 2SC2458			
Q503	8-729-245-83	TRANSISTOR 2SC2458			
Q504	8-729-245-83	TRANSISTOR 2SC2458			
Q620	8-729-204-83	TRANSISTOR 2SA1048-GR (EC MODEL)			
Q701	8-729-245-83	TRANSISTOR 2SC2458			
Q702	8-729-245-83	TRANSISTOR 2SC2458			
Q703	8-729-177-43	TRANSISTOR 2SD774			
Q704	8-729-204-83	TRANSISTOR 2SA1048-GR			
Q705	8-729-204-83	TRANSISTOR 2SA1048-GR			
Q706	8-729-245-83	TRANSISTOR 2SC2458			
Q707	8-729-245-83	TRANSISTOR 2SC2458			
Q803	8-729-245-83	TRANSISTOR 2SC2458			
Q806	8-729-245-83	TRANSISTOR 2SC2458 (EC MODEL)			
		RESISTOR			
R032	1-247-831-00	CARBON	1K	5%	1/6W
R035	1-247-859-00	CARBON	15K	5%	1/6W
R038	1-247-837-00	CARBON	1.8K	5%	1/6W
R039 ⚠	1-217-387-00	FUSIBLE	10	5%	1/4W F
R041	1-249-421-11	CARBON	2.2K	5%	1/6W

Ref.No	Part No.	Description			Remark
R046	1-247-835-00	CARBON	1.5K	5%	1/6W(EC MODEL)
R048	1-247-847-00	CARBON	4.7K	5%	1/6W(EC MODEL)
R050	1-247-853-00	CARBON	8.2K	5%	1/6W
R051	1-247-821-00	CARBON	390	5%	1/6W
R052	1-247-819-00	CARBON	330	5%	1/6W
R053	1-247-843-00	CARBON	3.3K	5%	1/6W
R054	1-247-847-00	CARBON	4.7K	5%	1/6W
R055	1-247-849-00	CARBON	5.6K	5%	1/6W(EC MODEL)
R056	1-247-867-00	CARBON	33K	5%	1/6W
R058	1-247-873-00	CARBON	56K	5%	1/6W
R059	1-247-863-91	CARBON	22K	5%	1/6W(AS MODEL)
R060	1-247-867-00	CARBON	33K	5%	1/6W(EC MODEL)
R061	1-247-855-00	CARBON	10K	5%	1/6W(EC MODEL)
R062	1-247-855-00	CARBON	10K	5%	1/6W
R063	1-247-841-00	CARBON	2.7K	5%	1/6W
R064	1-247-848-00	CARBON	5.1K	5%	1/6W
R065	1-247-889-00	CARBON	270K	5%	1/6W
R066	1-247-870-00	CARBON	43K	5%	1/6W
R067	1-247-862-00	CARBON	20K	5%	1/6W
R068	1-247-838-00	CARBON	2K	5%	1/6W
R069	1-247-831-00	CARBON	1K	5%	1/6W
R070	1-247-831-00	CARBON	1K	5%	1/6W
R071	1-247-855-00	CARBON	10K	5%	1/6W
R072	1-247-841-00	CARBON	2.7K	5%	1/6W
R073	1-247-831-00	CARBON	1K	5%	1/6W
R074	1-247-831-00	CARBON	1K	5%	1/6W
R075	1-247-815-00	CARBON	220	5%	1/6W
R076	1-247-855-00	CARBON	10K	5%	1/6W
R079	1-247-855-00	CARBON	10K	5%	1/6W(EC MODEL)
R080	1-247-853-00	CARBON	8.2K	5%	1/6W(EC MODEL)
R081	1-247-843-00	CARBON	3.3K	5%	1/6W
R082	1-247-871-00	CARBON	47K	5%	1/6W
R083	1-247-825-00	CARBON	560	5%	1/6W(EC MODEL)
R084	1-247-831-00	CARBON	1K	5%	1/6W(EC MODEL)
R085	1-247-800-00	CARBON	51	5%	1/6W(EC MODEL)
R086	1-247-825-00	CARBON	560	5%	1/6W
R087	1-247-825-00	CARBON	560	5%	1/6W
R088	1-247-807-00	CARBON	100	5%	1/6W
R091	1-247-824-00	CARBON	510	5%	1/6W(EC MODEL)
R092	1-247-785-00	CARBON	12	5%	1/6W(EC MODEL)
R093	1-247-806-00	CARBON	91	5%	1/6W(EC MODEL)
R094	1-247-871-00	CARBON	47K	5%	1/6W
R096	1-247-879-00	CARBON	100K	5%	1/6W(EC MODEL)
R097	1-247-881-00	CARBON	120K	5%	1/6W(EC MODEL)
R098	1-247-891-00	CARBON	330K	5%	1/6W
R100	1-247-873-00	CARBON	56K	5%	1/6W(EC MODEL)
R101	1-247-867-00	CARBON	33K	5%	1/6W(EC MODEL)
R103	1-247-831-00	CARBON	1K	5%	1/6W
R104	1-249-421-11	CARBON	2.2K	5%	1/6W
R105	1-247-829-00	CARBON	820	5%	1/6W
R106	1-247-831-00	CARBON	1K	5%	1/6W
R107	1-247-824-00	CARBON	510	5%	1/6W
R108	1-249-421-11	CARBON	2.2K	5%	1/6W

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

RY-4

Ref.No	Part No.	Description				Remark
R109	1-247-867-00	CARBON	33K	5%	1/6W	
R111	1-247-851-00	CARBON	6.8K	5%	1/6W	
R112	1-247-851-00	CARBON	6.8K	5%	1/6W	
R113	1-247-843-00	CARBON	3.3K	5%	1/6W	
R114	1-247-828-00	CARBON	750	5%	1/6W	
R115	1-247-879-00	CARBON	100K	5%	1/6W	
R116	1-247-853-00	CARBON	8.2K	5%	1/6W	
R117	1-247-846-00	CARBON	4.3K	5%	1/6W	
R120	1-247-831-00	CARBON	1K	5%	1/6W	
R121	1-247-831-00	CARBON	1K	5%	1/6W	
R122	1-249-421-11	CARBON	2.2K	5%	1/6W	
R125	1-247-831-00	CARBON	1K	5%	1/6W	
R126	1-247-831-00	CARBON	1K	5%	1/6W	
R127	1-247-835-00	CARBON	1.5K	5%	1/6W	
R128	1-247-831-00	CARBON	1K	5%	1/6W	
R129	1-247-867-00	CARBON	33K	5%	1/6W	
R130	1-247-843-00	CARBON	3.3K	5%	1/6W	
R131	1-247-841-00	CARBON	2.7K	5%	1/6W	
R132	1-247-887-00	CARBON	220K	5%	1/6W	
R133	1-247-807-00	CARBON	100	5%	1/6W	
R134	1-247-851-00	CARBON	6.8K	5%	1/6W	
R135	1-247-883-00	CARBON	150K	5%	1/6W	
R136	1-247-879-00	CARBON	100K	5%	1/6W	
R137	1-247-857-00	CARBON	12K	5%	1/6W	
R138	1-247-861-00	CARBON	18K	5%	1/6W	
R139	1-247-841-00	CARBON	2.7K	5%	1/6W	
R140	1-247-867-00	CARBON	33K	5%	1/6W	
R142	1-247-842-00	CARBON	3K	5%	1/6W	
R143	1-247-847-00	CARBON	4.7K	5%	1/6W	
R144	1-247-824-00	CARBON	510	5%	1/6W	
R145	1-247-831-00	CARBON	1K	5%	1/6W	
R146	1-247-831-00	CARBON	1K	5%	1/6W	
R147	1-247-855-00	CARBON	10K	5%	1/6W	
R148	1-247-831-00	CARBON	1K	5%	1/6W	
R149	1-247-819-00	CARBON	330	5%	1/6W	
R150	1-247-863-00	CARBON	22K	5%	1/6W	
R151	1-247-812-00	CARBON	160	5%	1/6W	
R152	1-247-829-00	CARBON	820	5%	1/6W	
R153	1-247-863-00	CARBON	22K	5%	1/6W	
R154	1-247-821-00	CARBON	390	5%	1/6W	
R155	1-249-421-11	CARBON	2.2K	5%	1/6W	
R156	1-249-421-11	CARBON	2.2K	5%	1/6W	
R157	1-247-837-00	CARBON	1.8K	5%	1/6W	
R158	1-247-817-00	CARBON	270	5%	1/6W	
R159	1-247-810-00	CARBON	130	5%	1/6W	
R160	1-247-832-00	CARBON	1.1K	5%	1/6W	
R161	1-247-855-00	CARBON	10K	5%	1/6W	
R162	1-247-853-00	CARBON	8.2K	5%	1/6W	
R163	1-247-831-00	CARBON	1K	5%	1/6W	
R165	1-247-833-00	CARBON	1.2K	5%	1/6W	
R166	1-247-807-00	CARBON	100	5%	1/6W	
R171	1-247-901-00	CARBON	820K	5%	1/6W	
R172	1-247-857-00	CARBON	12K	5%	1/6W	
R173	1-247-861-00	CARBON	18K	5%	1/6W	
R174	1-249-421-11	CARBON	2.2K	5%	1/6W	
R175	1-247-831-00	CARBON	1K	5%	1/6W	
R176	1-249-421-11	CARBON	2.2K	5%	1/6W	
R178	1-247-831-00	CARBON	1K	5%	1/6W	
R179	1-247-831-00	CARBON	1K	5%	1/6W	
R180	1-247-823-00	CARBON	470	5%	1/6W	
R181	1-247-823-00	CARBON	470	5%	1/6W	
R185	1-247-843-00	CARBON	3.3K	5%	1/6W	
R186	1-247-830-00	CARBON	910	5%	1/6W	
R187	1-247-831-00	CARBON	1K	5%	1/6W	
R189	1-247-834-00	CARBON	1.3K	5%	1/6W	
R190	1-247-834-00	CARBON	1.3K	5%	1/6W	
R191	1-247-831-00	CARBON	1K	5%	1/6W	
R192	1-247-831-00	CARBON	1K	5%	1/6W	
R193	1-247-855-00	CARBON	10K	5%	1/6W	
R194	1-247-819-00	CARBON	330	5%	1/6W	
R195	1-247-812-00	CARBON	160	5%	1/6W	
R196	1-247-863-00	CARBON	22K	5%	1/6W	
R197	1-247-863-00	CARBON	22K	5%	1/6W	
R198	1-247-829-00	CARBON	820	5%	1/6W	
R199	1-247-821-00	CARBON	390	5%	1/6W	
R200	1-249-421-11	CARBON	2.2K	5%	1/6W	
R201	1-247-837-00	CARBON	1.8K	5%	1/6W	
R202	1-247-831-00	CARBON	1K	5%	1/6W	
R203	1-247-815-00	CARBON	220	5%	1/6W	
R204	1-247-811-00	CARBON	150	5%	1/6W	
R205	1-247-811-00	CARBON	150	5%	1/6W	
R206	1-247-834-00	CARBON	1.3K	5%	1/6W	
R207	1-247-875-00	CARBON	68K	5%	1/6W	
R208	1-247-875-00	CARBON	68K	5%	1/6W	
R209	1-247-833-00	CARBON	1.2K	5%	1/6W	
R210	1-247-824-00	CARBON	510	5%	1/6W	
R211	1-247-831-00	CARBON	1K	5%	1/6W	
R212	1-247-824-00	CARBON	510	5%	1/6W	
R213	1-247-835-00	CARBON	1.5K	5%	1/6W	
R214	1-247-831-00	CARBON	1K	5%	1/6W	
R215	1-247-831-00	CARBON	1K	5%	1/6W	
R219	1-247-865-00	CARBON	27K	5%	1/6W	
R220	1-247-877-00	CARBON	82K	5%	1/6W	
R221	1-247-849-00	CARBON	5.6K	5%	1/6W	
R222	1-247-837-00	CARBON	1.8K	5%	1/6W	
R223	1-247-837-00	CARBON	1.8K	5%	1/6W	
R231	1-247-867-00	CARBON	33K	5%	1/6W	
R235	1-247-831-00	CARBON	1K	5%	1/6W	
R236	1-247-853-00	CARBON	8.2K	5%	1/6W	
R238	1-247-851-00	CARBON	6.8K	5%	1/6W	
R239	1-247-855-00	CARBON	10K	5%	1/6W	
R240	1-249-421-11	CARBON	2.2K	5%	1/6W	
R242	1-247-879-00	CARBON	100K	5%	1/6W	
R243	1-247-855-00	CARBON	10K	5%	1/6W	
R244	1-247-851-00	CARBON	6.8K	5%	1/6W	
R246	1-247-871-00	CARBON	47K	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R248	1-247-819-00	CARBON	330	5%	1/6W	
R274	1-247-883-00	CARBON	150K	5%	1/6W	
R275	1-247-871-00	CARBON	47K	5%	1/6W	
R276	1-247-849-00	CARBON	5.6K	5%	1/6W	
R277	1-247-855-00	CARBON	10K	5%	1/6W	
R280	1-247-835-00	CARBON	1.5K	5%	1/6W	
R281	1-247-890-00	CARBON	300K	5%	1/6W	
R282	1-247-819-00	CARBON	330	5%	1/6W	
R283	1-249-421-11	CARBON	2.2K	5%	1/6W	
R284	1-247-877-00	CARBON	82K	5%	1/6W	
R286	1-247-843-00	CARBON	3.3K	5%	1/6W	
R291	1-247-863-00	CARBON	22K	5%	1/6W	
R292	1-247-875-00	CARBON	68K	5%	1/6W	
R293	1-247-819-00	CARBON	330	5%	1/6W	
R295	1-249-421-11	CARBON	2.2K	5%	1/6W	
R296	1-247-811-00	CARBON	150	5%	1/6W	
R298	1-247-894-00	CARBON	430K	5%	1/6W	
R299	1-247-892-00	CARBON	360K	5%	1/6W	
R301	1-247-855-00	CARBON	10K	5%	1/6W	
R302	1-247-819-00	CARBON	330	5%	1/6W	
R303	1-247-819-00	CARBON	330	5%	1/6W	
R304	1-247-847-00	CARBON	4.7K	5%	1/6W	
R312	1-247-847-00	CARBON	4.7K	5%	1/6W	
R313	1-247-823-00	CARBON	470	5%	1/6W	
R320	1-247-878-00	CARBON	91K	5%	1/6W	
R321	1-247-887-00	CARBON	220K	5%	1/6W	
R325	1-247-807-00	CARBON	100	5%	1/6W	
R331	1-249-421-11	CARBON	2.2K	5%	1/6W	
R340	1-247-887-00	CARBON	220K	5%	1/6W(AS MODEL)	
R346	1-249-421-11	CARBON	2.2K	5%	1/6W	
R347	1-247-879-00	CARBON	100K	5%	1/6W(AS MODEL)	
R351	1-247-815-00	CARBON	220	5%	1/6W	
R353	1-247-831-00	CARBON	1K	5%	1/6W	
R357	1-247-829-00	CARBON	820	5%	1/6W	
R370	1-247-797-00	CARBON	39	5%	1/6W(EC MODEL)	
R370	1-247-799-00	CARBON	47	5%	1/6W(AS MODEL)	
R380	1-247-851-00	CARBON	6.8K	5%	1/6W	
R381	1-247-853-00	CARBON	8.2K	5%	1/6W	
R382	1-247-831-00	CARBON	1K	5%	1/6W	
R383	1-247-847-00	CARBON	4.7K	5%	1/6W	
R389	1-247-832-00	CARBON	1.1K	5%	1/6W	
R401	1-247-810-00	CARBON	130	5%	1/6W	
R402	1-247-806-00	CARBON	91	5%	1/6W	
R403	1-247-867-00	CARBON	33K	5%	1/6W	
R404	1-247-873-00	CARBON	47K	5%	1/6W	
R405	1-247-831-00	CARBON	1K	5%	1/6W	
R406	1-247-832-00	CARBON	1.1K	5%	1/6W	
R407	1-247-832-00	CARBON	1.1K	5%	1/6W	
R408	1-247-849-00	CARBON	5.6K	5%	1/6W	
R409	1-247-831-00	CARBON	1K	5%	1/6W	
R410	1-247-831-00	CARBON	1K	5%	1/6W	
R411	1-247-847-00	CARBON	4.7K	5%	1/6W	
R412	1-247-828-00	CARBON	750	5%	1/6W	
R413	1-247-812-00	CARBON	160	5%	1/6W	
R414	1-247-847-00	CARBON	4.7K	5%	1/6W	
R415	1-247-831-00	CARBON	1K	5%	1/6W	
R416	1-247-846-00	CARBON	4.3K	5%	1/6W	
R510	1-247-824-00	CARBON	510	5%	1/6W	
R511	1-247-867-00	CARBON	33K	5%	1/6W(EC MODEL)	
R512	1-247-847-00	CARBON	4.7K	5%	1/6W	
R513	1-247-863-00	CARBON	22K	5%	1/6W	
R514	1-247-821-00	CARBON	390	5%	1/6W	
R515	1-249-421-11	CARBON	2.2K	5%	1/6W	
R516	1-247-821-00	CARBON	390	5%	1/6W	
R517	1-247-821-00	CARBON	390	5%	1/6W	
R518	1-247-821-00	CARBON	390	5%	1/6W	
R519	1-247-821-00	CARBON	390	5%	1/6W	
R520	1-249-421-11	CARBON	2.2K	5%	1/6W	
R521	1-247-821-00	CARBON	390	5%	1/6W	
R522	1-249-421-11	CARBON	2.2K	5%	1/6W	
R525	1-247-843-00	CARBON	3.3K	5%	1/6W	
R601	1-247-847-00	CARBON	4.7K	5%	1/6W	
R603	1-247-843-00	CARBON	3.3K	5%	1/6W	
R607	1-247-855-00	CARBON	10K	5%	1/6W(EC MODEL)	
R638	1-247-807-00	CARBON	100	5%	1/6W(EC MODEL)	
R639	1-247-831-00	CARBON	1K	5%	1/6W(EC MODEL)	
R640	1-247-815-00	CARBON	220	5%	1/6W(EC MODEL)	
R641	1-247-823-00	CARBON	470	5%	1/6W(EC MODEL)	
R643	1-247-875-00	CARBON	68K	5%	1/6W	
R701	1-247-831-00	CARBON	1K	5%	1/6W	
R702	1-247-818-00	CARBON	300	5%	1/6W	
R704	1-247-857-00	CARBON	12K	5%	1/6W	
R709	1-247-832-00	CARBON	1.1K	5%	1/6W	
R710	1-247-829-00	CARBON	820	5%	1/6W	
R712	1-247-831-00	CARBON	1K	5%	1/6W	
R713	1-247-831-00	CARBON	1K	5%	1/6W	
R716	1-247-879-00	CARBON	100K	5%	1/6W	
R717	1-247-835-00	CARBON	1.5K	5%	1/6W	
R720	1-247-818-00	CARBON	300	5%	1/6W	
R722	1-247-867-00	CARBON	33K	5%	1/6W	
R723	1-247-863-00	CARBON	22K	5%	1/6W	
R724	1-247-825-00	CARBON	560	5%	1/6W	
R725	1-247-825-00	CARBON	560	5%	1/6W	
R726	1-247-823-00	CARBON	470	5%	1/6W	
R728	1-247-825-00	CARBON	560	5%	1/6W	
R730	1-247-859-00	CARBON	15K	5%	1/6W	
R736	1-247-835-00	CARBON	1.5K	5%	1/6W	
R737	1-247-857-00	CARBON	12K	5%	1/6W	
R739 ⚠	1-217-387-00	FUSIBLE	10	5%	1/4W	F
R740	1-247-831-00	CARBON	1K	5%	1/6W	
R742	1-247-831-00	CARBON	1K	5%	1/6W	
R743	1-247-829-00	CARBON	820	5%	1/6W	
R745	1-247-807-00	CARBON	100	5%	1/6W	
R748	1-247-819-00	CARBON	330	5%	1/6W	
R749	1-247-819-00	CARBON	330	5%	1/6W	
R750	1-247-831-00	CARBON	1K	5%	1/6W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description				Remark
R751	1-247-857-00	CARBON	12K	5%	1/6W	
R752	1-247-858-00	CARBON	13K	5%	1/6W	
R753	1-247-831-00	CARBON	1K	5%	1/6W	
R754	1-247-831-00	CARBON	1K	5%	1/6W	
R755	1-247-825-00	CARBON	560	5%	1/6W	
R756	1-247-831-00	CARBON	1K	5%	1/6W	
R757	1-247-851-00	CARBON	6.8K	5%	1/6W	
R758	1-247-855-00	CARBON	10K	5%	1/6W	
R759	1-249-421-11	CARBON	2.2K	5%	1/6W	
R760	1-247-828-00	CARBON	750	5%	1/6W	
R767	1-247-863-00	CARBON	22K	5%	1/6W	
R802	1-247-831-00	CARBON	1K	5%	1/6W	
R803	1-247-807-00	CARBON	100	5%	1/6W	
R804	1-249-421-11	CARBON	2.2K	5%	1/6W	
R807	1-247-879-00	CARBON	100K	5%	1/6W	
R808	1-247-871-00	CARBON	47K	5%	1/6W(AS MODEL)	
R809	1-247-891-00	CARBON	330K	5%	1/6W(EC MODEL)	
R811	1-247-843-00	CARBON	3.3K	5%	1/6W	
R812	1-247-855-00	CARBON	10K	5%	1/6W	
R814	1-247-903-00	CARBON	1M	5%	1/6W	
R815	1-247-831-00	CARBON	1K	5%	1/6W	
R816	1-247-899-00	CARBON	680K	5%	1/6W	
R817	1-215-451-00	METAL	18K	1%	1/6W	
R818	1-215-461-00	METAL	47K	1%	1/6W	
R821	1-249-421-11	CARBON	2.2K	5%	1/6W(EC MODEL)	
R822	1-249-421-11	CARBON	2.2K	5%	1/6W(EC MODEL)	
R823	1-247-867-00	CARBON	33K	5%	1/6W	
R824	1-247-863-00	CARBON	22K	5%	1/6W	
R825	1-247-881-00	CARBON	120K	5%	1/6W	
R827	1-247-831-00	CARBON	1K	5%	1/6W	
R828	1-247-831-00	CARBON	1K	5%	1/6W	

VARIABLE RESISTOR

Ref.No	Part No.	Description
RV001	1-228-989-00	RES, ADJ, METAL GLAZE 470 (EC MODEL)
RV002	1-228-994-00	RES, ADJ, CARBON 10K
RV003	1-228-996-00	RES, ADJ, CARBON 47K
RV004	1-228-989-00	RES, ADJ, METAL GLAZE 470
RV005	1-228-996-00	RES, ADJ, CARBON 47K
RV006	1-228-995-00	RES, ADJ, CARBON 22K
RV007	1-228-994-00	RES, ADJ, CARBON 10K
RV008	1-228-991-00	RES, ADJ, CARBON 2.2K
RV009	1-228-996-00	RES, ADJ, CARBON 47K
RV010	1-228-995-00	RES, ADJ, CARBON 22K
RV013	1-228-996-00	RES, ADJ, CARBON 47K
RV014	1-228-989-00	RES, ADJ, CARBON 470
RV015	1-228-989-00	RES, ADJ, METAL GLAZE 470
RV016	1-228-990-00	RES, ADJ, CARBON 1K
RV019	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K
RV020	1-228-990-00	RES, ADJ, CARBON 1K
RV021	1-228-996-00	RES, ADJ, CARBON 47K
RV401	1-228-994-00	RES, ADJ, METAL GLAZE 10K
RV501	1-228-989-00	RES, ADJ, METAL GLAZE 470
RV701	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K

Ref.No	Part No.	Description	Remark
RV702	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV703	1-228-990-00	RES, ADJ, CARBON 1K	
RV704	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	

SWITCH

Ref.No	Part No.	Description
S701	1-553-510-00	SWITCH, SLIDE

TRANSFORMER

Ref.No	Part No.	Description
T001	0-366-448-00	COIL, REC C BPF

CRYSTAL

Ref.No	Part No.	Description
X001	1-527-345-00	CRYSTAL, OSC

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Part No.	Description
*A-6713-240-A	AF-7 BOARD, COMPLETE *********************
*1-536-920-11	TERMINAL BOARD, CONTROL PANEL
1-562-121-00	CONNECTOR, DIN 6P
*3-684-072-01	LID, BOTTOM, AF SHIELD CASE(S)
*3-684-087-01	CASE (S) (MAIN), SHIELD, AF

CAPACITOR

Ref.No	Part No.	Description			
C001	1-124-473-11	ELECT	1000MF	20%	10V
C002	1-123-356-00	ELECT	10MF	20%	16V
C003	1-123-356-00	ELECT	10MF	20%	16V
C004	1-123-356-00	ELECT	10MF	20%	16V
C005	1-123-356-00	ELECT	10MF	20%	16V
C006	1-124-473-11	ELECT	1000MF	20%	10V
C007	1-123-323-00	ELECT	470MF	20%	16V
C009	1-123-356-00	ELECT	10MF	20%	16V
C010	1-123-333-00	ELECT	100MF	20%	16V
C011	1-101-004-00	CERAMIC	0.01MF		50V
C012	1-123-356-00	ELECT	10MF	20%	16V
C013	1-161-025-00	CERAMIC	0.1MF	10%	25V
C014	1-123-332-00	ELECT	47MF	20%	16V
C015	1-161-025-00	CERAMIC	0.1MF	10%	25V
C016	1-101-004-00	CERAMIC	0.01MF		50V
C017	1-123-356-00	ELECT	10MF	20%	16V
C018	1-123-356-00	ELECT	10MF	20%	16V
C019	1-123-318-00	ELECT	33MF	20%	16V
C020	1-123-318-00	ELECT	33MF	20%	16V
C021	1-123-356-00	ELECT	10MF	20%	16V
C022	1-123-356-00	ELECT	10MF	20%	16V
C023	1-123-356-00	ELECT	10MF	20%	16V
C024	1-101-004-00	CERAMIC	0.01MF		50V
C025	1-101-004-00	CERAMIC	0.01MF		50V
C026	1-101-004-00	CERAMIC	0.01MF		50V
C027	1-101-004-00	CERAMIC	0.01MF		50V
C029	1-123-356-00	ELECT	10MF	20%	16V
C030	1-123-356-00	ELECT	10MF	20%	16V
C031	1-123-330-00	ELECT	22MF	20%	16V
C032	1-130-475-00	MYLAR	0.0022MF	5%	50V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C033	1-130-482-00	MYLAR	0.0082MF	5%	50V
C034	1-102-824-00	CERAMIC	470PF	5%	50V
C035	1-130-477-00	MYLAR	0.0033MF	5%	50V
C036	1-123-369-00	ELECT	4.7MF	20%	50V
C037	1-123-369-00	ELECT	4.7MF	20%	50V
C038	1-102-518-00	CERAMIC	33PF	5%	50V
C039	1-102-518-00	CERAMIC	33PF	5%	50V
C040	1-102-822-00	CERAMIC	390PF	5%	50V
C041	1-102-822-00	CERAMIC	390PF	5%	50V
C042	1-101-004-00	CERAMIC	0.01MF		50V
C043	1-101-004-00	CERAMIC	0.01MF		50V
C044	1-161-025-00	CERAMIC	0.1MF	10%	25V
C045	1-161-025-00	CERAMIC	0.1MF	10%	25V
C046	1-161-025-00	CERAMIC	0.1MF	10%	25V
C047	1-123-318-00	ELECT	33MF	20%	16V
C048	1-123-318-00	ELECT	33MF	20%	16V
C049	1-161-025-00	CERAMIC	0.1MF	10%	25V
C050	1-161-025-00	CERAMIC	0.1MF	10%	25V
C051	1-161-025-00	CERAMIC	0.1MF	10%	25V
C052	1-101-004-00	CERAMIC	0.01MF		50V
C053	1-101-004-00	CERAMIC	0.01MF		50V
C054	1-123-380-00	ELECT	1MF	20%	50V
C055	1-101-361-00	CERAMIC	150PF	5%	50V
C056	1-123-380-00	ELECT	1MF	20%	50V
C058	1-161-025-00	CERAMIC	0.1MF	10%	25V
C060	1-101-004-00	CERAMIC	0.01MF		50V
C061	1-123-332-00	ELECT	47MF	20%	16V
C062	1-161-025-00	CERAMIC	0.1MF	10%	25V
C063	1-102-978-00	CERAMIC	220PF	5%	50V
C064	1-102-978-00	CERAMIC	220PF	5%	50V
C065	1-102-522-00	CERAMIC	51PF	5%	50V
C066	1-102-531-00	CERAMIC	150PF	5%	50V
C067	1-102-531-00	CERAMIC	150PF	5%	50V
C068	1-102-520-00	CERAMIC	39PF	5%	50V
C070	1-123-356-00	ELECT	10MF	20%	16V
C071	1-123-333-00	ELECT	100MF	20%	16V
C072	1-101-004-00	CERAMIC	0.01MF		50V
C073	1-101-004-00	CERAMIC	0.01MF		50V
C074	1-123-382-00	ELECT	3.3MF	20%	50V
C075	1-123-382-00	ELECT	3.3MF	20%	50V
C076	1-101-004-00	CERAMIC	0.01MF		50V
C077	1-123-356-00	ELECT	10MF	20%	16V
C078	1-101-004-00	CERAMIC	0.01MF		50V
C079	1-101-004-00	CERAMIC	0.01MF		50V
C080	1-101-004-00	CERAMIC	0.01MF		50V
C081	1-101-004-00	CERAMIC	0.01MF		50V
C082	1-101-004-00	CERAMIC	0.01MF		50V
C083	1-123-356-00	ELECT	10MF	20%	16V
C084	1-101-004-00	CERAMIC	0.01MF		50V
C085	1-101-004-00	CERAMIC	0.01MF		50V
C086	1-101-004-00	CERAMIC	0.01MF		50V
C087	1-101-004-00	CERAMIC	0.01MF		50V
C088	1-123-382-00	ELECT	3.3MF	20%	50V
C089	1-123-382-00	ELECT	3.3MF	20%	50V
C090	1-101-004-00	CERAMIC	0.01MF		50V
C091	1-101-004-00	CERAMIC	0.01MF		50V
C092	1-123-356-00	ELECT	10MF	20%	16V
C093	1-123-356-00	ELECT	10MF	20%	16V
C094	1-101-004-00	CERAMIC	0.01MF		50V
C095	1-101-004-00	CERAMIC	0.01MF		50V
C096	1-123-333-00	ELECT	100MF	20%	16V
C097	1-123-356-00	ELECT	10MF	20%	16V
C098	1-123-332-00	ELECT	47MF	20%	16V
C099	1-123-332-00	ELECT	47MF	20%	16V
C100	1-102-958-00	CERAMIC	20PF	5%	50V
C101	1-130-485-00	MYLAR	0.015MF	5%	50V
C102	1-130-485-00	MYLAR	0.015MF	5%	50V
C103	1-130-498-00	MYLAR	0.18MF	5%	50V
C104	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C105	1-130-469-00	MYLAR	680PF	5%	50V
C106	1-130-485-00	MYLAR	0.015MF	5%	50V
C107	1-130-475-00	MYLAR	0.0022MF	5%	50V
C108	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C109	1-130-491-00	MYLAR	0.047MF	5%	50V
C110	1-130-493-00	MYLAR	0.068MF	5%	50V
C111	1-131-371-00	TANTALUM	10MF	10%	16V
C112	1-131-408-00	TANTALUM	1MF	10%	25V
C113	1-123-330-00	ELECT	22MF	20%	16V
C114	1-123-333-00	ELECT	100MF	20%	16V
C115	1-101-004-00	CERAMIC	0.01MF		50V
C116	1-131-408-00	TANTALUM	1MF	10%	25V
C117	1-131-371-00	TANTALUM	10MF	10%	16V
C118	1-123-330-00	ELECT	22MF	20%	16V
C119	1-130-493-00	MYLAR	0.068MF	5%	50V
C120	1-130-491-00	MYLAR	0.047MF	5%	50V
C121	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C122	1-130-475-00	MYLAR	0.0022MF	5%	50V
C123	1-130-485-00	MYLAR	0.015MF	5%	50V
C124	1-130-469-00	MYLAR	680PF	5%	50V
C125	1-130-498-00	MYLAR	0.18MF	5%	50V
C126	1-130-485-00	MYLAR	0.015MF	5%	50V
C127	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C128	1-130-485-00	MYLAR	0.015MF	5%	50V
C129	1-102-958-00	CERAMIC	20PF	5%	50V
C130	1-123-332-00	ELECT	47MF	20%	16V
C131	1-123-332-00	ELECT	47MF	20%	16V
C132	1-123-356-00	ELECT	10MF	20%	16V
C133	1-101-004-00	CERAMIC	0.01MF		50V
C134	1-123-333-00	ELECT	100MF	20%	16V
C135	1-123-381-00	ELECT	2.2MF	20%	50V
C136	1-123-332-00	ELECT	47MF	20%	16V
C137	1-123-356-00	ELECT	10MF	20%	16V
C138	1-123-356-00	ELECT	10MF	20%	16V
C139	1-123-356-00	ELECT	10MF	20%	16V
C140	1-123-330-00	ELECT	22MF	20%	16V
C141	1-123-356-00	ELECT	10MF	20%	16V

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description			Remark
C142	1-123-356-00	ELECT	10MF	20%	16V
C143	1-123-330-00	ELECT	22MF	20%	16V
C145	1-123-356-00	ELECT	10MF	20%	16V
C146	1-123-356-00	ELECT	10MF	20%	16V
C147	1-123-330-00	ELECT	22MF	20%	16V
C148	1-123-356-00	ELECT	10MF	20%	16V
C149	1-123-356-00	ELECT	10MF	20%	16V
C150	1-102-961-21	CERAMIC	27PF	5%	50V
C151	1-102-961-21	CERAMIC	27PF	5%	50V
C152	1-123-330-00	ELECT	22MF	20%	16V
C153	1-123-330-00	ELECT	22MF	20%	16V
C154	1-123-330-00	ELECT	22MF	20%	16V
C155	1-123-330-00	ELECT	22MF	20%	16V
C156	1-123-356-00	ELECT	10MF	20%	16V
C157	1-123-356-00	ELECT	10MF	20%	16V
C158	1-123-356-00	ELECT	10MF	20%	16V
C159	1-123-356-00	ELECT	10MF	20%	16V
C160	1-123-332-00	ELECT	47MF	20%	16V
C163	1-130-474-00	MYLAR	0.0018MF	5%	50V
C164	1-130-476-00	MYLAR	0.0027MF	5%	50V
C165	1-130-478-00	MYLAR	0.0039MF	5%	50V
C166	1-130-474-00	MYLAR	0.0018MF	5%	50V
C167	1-130-476-00	MYLAR	0.0027MF	5%	50V
C168	1-130-478-00	MYLAR	0.0039MF	5%	50V
C169	1-123-380-00	ELECT	1MF	20%	50V
C170	1-123-380-00	ELECT	1MF	20%	50V
C171	1-123-381-00	ELECT	2.2MF	20%	50V
C172	1-123-356-00	ELECT	10MF	20%	16V
C173	1-123-356-00	ELECT	10MF	20%	16V
C174	1-123-318-00	ELECT	33MF	20%	16V
C175	1-123-318-00	ELECT	33MF	20%	16V
C176	1-123-356-00	ELECT	10MF	20%	16V
C177	1-123-356-00	ELECT	10MF	20%	16V
C178	1-123-356-00	ELECT	10MF	20%	16V
C179	1-101-004-00	CERAMIC	0.01MF		50V
C180	1-101-004-00	CERAMIC	0.01MF		50V
C181	1-101-004-00	CERAMIC	0.01MF		50V
C182	1-101-004-00	CERAMIC	0.01MF		50V
C183	1-123-356-00	ELECT	10MF	20%	16V
C184	1-123-379-00	ELECT	0.47MF	20%	50V
C185	1-123-356-00	ELECT	10MF	20%	16V
C186	1-123-356-00	ELECT	10MF	20%	16V
C187	1-123-330-00	ELECT	22MF	20%	16V
C188	1-130-475-00	MYLAR	0.0022MF	5%	50V
C189	1-130-482-00	MYLAR	0.0082MF	5%	50V
C190	1-102-824-00	CERAMIC	470PF	5%	50V
C191	1-130-477-00	MYLAR	0.0033MF	5%	50V
C192	1-123-369-00	ELECT	4.7MF	20%	50V
C193	1-123-369-00	ELECT	4.7MF	20%	50V
C194	1-161-025-00	CERAMIC	0.1MF	10%	25V
C195	1-123-332-00	ELECT	47MF	20%	16V
C196	1-123-333-00	ELECT	100MF	20%	16V
C197	1-161-025-00	CERAMIC	0.1MF	10%	25V
C198	1-123-323-00	ELECT	470MF	20%	16V
C204	1-123-332-00	ELECT	47MF	20%	16V
C205	1-123-333-00	ELECT	100MF	20%	16V
C206	1-123-332-00	ELECT	47MF	20%	16V
C207	1-123-330-00	ELECT	22MF	20%	16V
C208	1-123-356-00	ELECT	10MF	20%	16V
C209	1-123-356-00	ELECT	10MF	20%	16V
C210	1-123-332-00	ELECT	47MF	20%	16V
C211	1-101-004-00	CERAMIC	0.01MF		50V
C212	1-101-004-00	CERAMIC	0.01MF		50V
C213	1-123-356-00	ELECT	10MF	20%	16V
C214	1-123-323-00	ELECT	470MF	20%	16V
C215	1-123-356-00	ELECT	10MF	20%	16V
C216	1-123-356-00	ELECT	10MF	20%	16V
C217	1-101-004-00	CERAMIC	0.01MF		50V
C218	1-123-307-00	ELECT	100MF	20%	10V
C219	1-101-004-00	CERAMIC	0.01MF		50V
C220	1-102-949-00	CERAMIC	12PF	5%	50V
C221	1-102-949-00	CERAMIC	12PF	5%	50V

CONNECTOR

Ref.No	Part No.	Description	Remark
CN001	*1-560-892-00	PIN, CONNECTOR 4P	
CN002	*1-560-893-00	PIN, CONNECTOR 5P	
CN003	*1-560-893-00	PIN, CONNECTOR 5P	
CN004	*1-560-894-00	PIN, CONNECTOR 6P	
CN005	*1-560-894-00	PIN, CONNECTOR 6P	
CN006	*1-560-894-00	PIN, CONNECTOR 6P	
CN007	*1-564-031-00	PIN, CONNECTOR 6P	
CN008	*1-564-030-00	PIN, CONNECTOR 5P	
CN009	*1-560-892-00	PIN, CONNECTOR 4P	
CN010	*1-560-900-00	PIN, CONNECTOR 12P	
CN011	*1-560-894-00	PIN, CONNECTOR 6P	
CN012	1-562-121-00	CONNECTOR, DIN 6P	
CN013	*1-564-027-00	PIN, CONNECTOR 2P	

DIODE

Ref.No	Part No.	Description	Remark
D001	8-719-911-19	DIODE 1SS119	
D002	8-719-911-19	DIODE 1SS119	
D003	8-719-911-19	DIODE 1SS119	
D004	8-719-911-19	DIODE 1SS119	
D005	8-719-911-19	DIODE 1SS119	
D006	8-719-911-19	DIODE 1SS119	
D007	8-719-911-19	DIODE 1SS119	
D008	8-719-911-19	DIODE 1SS119	
D009	8-719-911-19	DIODE 1SS119	
D010	8-719-000-12	DIODE MC931	
D011	8-719-000-12	DIODE MC931	
D012	8-719-911-19	DIODE 1SS119	
D013	8-719-911-19	DIODE 1SS119	
D016	8-719-911-19	DIODE 1SS119	
D017	8-719-911-19	DIODE 1SS119	
D018	8-719-911-19	DIODE 1SS119	
D019	8-719-911-19	DIODE 1SS119	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
D020	8-719-162-07	DIODE RD6.2E-B	
D023	8-719-911-19	DIODE 1SS119	
D024	8-719-911-19	DIODE 1SS119	
D025	8-719-911-19	DIODE 1SS119	
D027	8-719-102-73	DIODE RD6.2EN1	
D028	8-719-911-19	DIODE 1SS119	
D029	8-719-911-19	DIODE 1SS119	
D030	8-719-911-19	DIODE 1SS119	
D031	8-719-911-19	DIODE 1SS119	
D032	8-719-911-19	DIODE 1SS119	
D033	8-719-911-19	DIODE 1SS119	
D034	8-719-911-19	DIODE 1SS119	
D037	8-719-911-19	DIODE 1SS119	
D038	8-719-911-19	DIODE 1SS119	
D039	8-719-911-19	DIODE 1SS119	
D040	8-719-000-12	DIODE MC931	
D042	8-719-911-19	DIODE 1SS119	
D043	8-719-911-19	DIODE 1SS119	
		FILTER	
FL001	1-235-367-11	B.P.F	
FL002	1-235-367-11	B.P.F	
FL003	1-235-366-11	B.P.F	
FL004	1-235-366-11	B.P.F	
FL005	1-235-365-11	L.P.F	
FL006	1-235-365-11	L.P.F	
		IC	
IC001	8-759-979-26	IC CX-7926	
IC002	8-752-010-50	IC CX20105	
IC003	8-752-010-40	IC CX20104	
IC004	8-752-009-70	IC CX20097	
IC005	8-759-700-62	IC NJM4562D	
IC006	8-759-240-66	IC TC4066BP	
IC007	8-759-915-48	IC TK15011Z	
IC008	8-752-010-50	IC CX20105	
		COIL	
L001	1-408-454-31	MICRO INDUCTOR 100UH	
L002	1-408-454-31	MICRO INDUCTOR 100UH	
L003	1-408-405-00	MICRO INDUCTOR 4.7UH	
L004	1-408-454-31	MICRO INDUCTOR 100UH	
L005	1-408-454-31	MICRO INDUCTOR 100UH	
L006	1-408-418-00	MICRO INDUCTOR 56UH	
L007	1-408-415-00	MICRO INDUCTOR 33UH	
L008	1-408-416-00	MICRO INDUCTOR 39UH	
L009	1-408-413-00	MICRO INDUCTOR 22UH	
L010	1-408-405-00	MICRO INDUCTOR 4.7UH	
		TRANSISTOR	
Q001	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q002	8-729-900-36	TRANSISTOR DTC124ES	
Q003	8-729-600-12	TRANSISTOR 2SK108-C	

Ref.No	Part No.	Description	Remark
Q004	8-729-245-83	TRANSISTOR 2SC2458	
Q005	8-729-600-12	TRANSISTOR 2SK108-C	
Q006	8-729-245-83	TRANSISTOR 2SC2458	
Q007	8-729-245-83	TRANSISTOR 2SC2458	
Q008	8-729-245-83	TRANSISTOR 2SC2458	
Q009	8-729-245-83	TRANSISTOR 2SC2458	
Q010	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q011	8-729-800-42	TRANSISTOR 2SK152-2	
Q012	8-729-900-89	TRANSISTOR DTC144ES	
Q013	8-729-900-89	TRANSISTOR DTC144ES	
Q014	8-729-800-42	TRANSISTOR 2SK152-2	
Q015	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q016	8-729-245-83	TRANSISTOR 2SC2458	
Q017	8-729-900-89	TRANSISTOR DTC144ES	
Q018	8-729-900-89	TRANSISTOR DTC144ES	
Q019	8-729-113-33	TRANSISTOR 2SB733-4	
Q020	8-729-384-48	TRANSISTOR 2SA844-D	
Q021	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q024	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q025	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q026	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q027	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q028	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q031	8-729-900-89	TRANSISTOR DTC144ES	
Q032	8-729-900-89	TRANSISTOR DTC144ES	
Q033	8-729-900-89	TRANSISTOR DTC144ES	
Q034	8-729-900-89	TRANSISTOR DTC144ES	
Q035	8-729-900-89	TRANSISTOR DTC144ES	
Q036	8-729-245-83	TRANSISTOR 2SC2458	
Q037	8-729-245-83	TRANSISTOR 2SC2458	
Q038	8-729-245-83	TRANSISTOR 2SC2458	
Q039	8-729-900-80	TRANSISTOR DTC114ES	
Q040	8-729-900-80	TRANSISTOR DTC114ES	
Q041	8-729-900-80	TRANSISTOR DTC114ES	
Q042	8-729-900-80	TRANSISTOR DTC114ES	
Q043	8-729-900-80	TRANSISTOR DTC114ES	
Q044	8-729-900-80	TRANSISTOR DTC114ES	
Q045	8-729-900-89	TRANSISTOR DTC144ES	
Q049	8-729-117-54	TRANSISTOR 2SA1175-F	
Q050	8-729-900-89	TRANSISTOR DTC144ES	
Q051	8-729-900-89	TRANSISTOR DTC144ES	
Q052	8-729-245-83	TRANSISTOR 2SC2458	
Q053	8-729-900-89	TRANSISTOR DTC144ES	
Q054	8-729-900-89	TRANSISTOR DTC144ES	
Q055	8-729-900-89	TRANSISTOR DTC144ES	
Q056	8-729-900-89	TRANSISTOR DTC144ES	
Q057	8-729-900-89	TRANSISTOR DTC144ES	
Q058	8-729-177-43	TRANSISTOR 2SD774-3	
Q059	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q060	8-729-900-89	TRANSISTOR DTC144ES	
Q061	8-729-900-89	TRANSISTOR DTC144ES	
Q062	8-729-245-83	TRANSISTOR 2SC2458	
Q063	8-729-245-83	TRANSISTOR 2SC2458	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
Q064	8-729-900-89	TRANSISTOR DTC144ES				
Q065	8-729-113-33	TRANSISTOR 2SB733-4				
Q066	8-729-900-89	TRANSISTOR DTC144ES				
Q067	8-729-900-89	TRANSISTOR DTC144ES				

RESISTOR

Ref.No	Part No.	Description				Remark
R001	1-247-803-00	CARBON	68	5%	1/6W	
R002	1-247-804-00	CARBON	75	5%	1/6W	
R003	1-249-421-11	CARBON	2.2K	5%	1/6W	
R004	1-247-831-00	CARBON	1K	5%	1/6W	
R005	1-247-827-00	CARBON	680	5%	1/6W	
R006	1-247-871-00	CARBON	47K	5%	1/6W	
R007	1-247-871-00	CARBON	47K	5%	1/6W	
R008	1-247-814-00	CARBON	200	5%	1/6W	
R009	1-247-840-00	CARBON	2.4K	5%	1/6W	
R010	1-247-879-00	CARBON	100K	5%	1/6W	
R011	1-247-879-00	CARBON	100K	5%	1/6W	
R012	1-247-879-00	CARBON	100K	5%	1/6W	
R013	1-247-827-00	CARBON	680	5%	1/6W	
R014	1-247-871-00	CARBON	47K	5%	1/6W	
R015	1-247-871-00	CARBON	47K	5%	1/6W	
R016	1-247-814-00	CARBON	200	5%	1/6W	
R017	1-247-840-00	CARBON	2.4K	5%	1/6W	
R018	1-247-879-00	CARBON	100K	5%	1/6W	
R019	1-247-879-00	CARBON	100K	5%	1/6W	
R020	1-247-803-00	CARBON	68	5%	1/6W	
R021	1-247-847-00	CARBON	4.7K	5%	1/6W	
R022	1-247-831-00	CARBON	1K	5%	1/6W	
R023	1-247-808-00	CARBON	110	5%	1/6W	
R024	1-247-811-00	CARBON	150	5%	1/6W	
R025	1-247-841-00	CARBON	2.7K	5%	1/6W	
R026	1-247-855-00	CARBON	10K	5%	1/6W	
R028	1-247-857-00	CARBON	12K	5%	1/6W	
R029	1-247-865-00	CARBON	27K	5%	1/6W	
R030	1-247-841-00	CARBON	2.7K	5%	1/6W	
R031	1-247-863-00	CARBON	22K	5%	1/6W	
R032	1-247-858-00	CARBON	13K	5%	1/6W	
R033	1-247-855-00	CARBON	10K	5%	1/6W	
R034	1-249-421-11	CARBON	2.2K	5%	1/6W	
R036	1-249-421-11	CARBON	2.2K	5%	1/6W	
R037	1-247-861-00	CARBON	18K	5%	1/6W	
R038	1-247-850-00	CARBON	6.2K	5%	1/6W	
R039	1-247-848-00	CARBON	5.1K	5%	1/6W	
R040	1-247-898-00	CARBON	620K	5%	1/6W	
R041	1-247-843-00	CARBON	3.3K	5%	1/6W	
R042	1-247-843-00	CARBON	3.3K	5%	1/6W	
R043	1-247-843-00	CARBON	3.3K	5%	1/6W	
R044	1-247-831-00	CARBON	1K	5%	1/6W	
R045	1-247-831-00	CARBON	1K	5%	1/6W	
R047	1-247-831-00	CARBON	1K	5%	1/6W	
R048	1-247-831-00	CARBON	1K	5%	1/6W	
R049	1-247-831-00	CARBON	1K	5%	1/6W	
R050	1-247-831-00	CARBON	1K	5%	1/6W	
R051	1-247-831-00	CARBON	1K	5%	1/6W	
R053	1-247-807-00	CARBON	100	5%	1/6W	
R054	1-249-421-11	CARBON	2.2K	5%	1/6W	
R055	1-247-819-00	CARBON	330	5%	1/6W	
R056	1-247-843-00	CARBON	3.3K	5%	1/6W	
R057	1-247-819-00	CARBON	330	5%	1/6W	
R058	1-247-827-00	CARBON	680	5%	1/6W	
R059	1-247-849-00	CARBON	5.6K	5%	1/6W	
R060	1-247-827-00	CARBON	680	5%	1/6W	
R061	1-247-807-00	CARBON	100	5%	1/6W	
R062	1-249-421-11	CARBON	2.2K	5%	1/6W	
R063	1-247-843-00	CARBON	3.3K	5%	1/6W	
R064	1-247-819-00	CARBON	330	5%	1/6W	
R065	1-247-819-00	CARBON	330	5%	1/6W	
R066	1-247-827-00	CARBON	680	5%	1/6W	
R067	1-247-849-00	CARBON	5.6K	5%	1/6W	
R068	1-247-827-00	CARBON	680	5%	1/6W	
R070	1-247-869-00	CARBON	39K	5%	1/6W	
R071	1-247-857-00	CARBON	12K	5%	1/6W	
R072 ⚠	1-213-128-00	METAL OXIDE	56	5%	1W	F
R073	1-247-826-00	CARBON	620	5%	1/6W	
R074	1-247-823-00	CARBON	470	5%	1/6W	
R075	1-247-820-00	CARBON	360	5%	1/6W	
R076	1-214-673-00	METAL	4.7	1%	1/4W	
R077	1-247-831-00	CARBON	1K	5%	1/6W	
R078	1-247-819-00	CARBON	330	5%	1/6W	
R079	1-247-853-00	CARBON	8.2K	5%	1/6W	
R081	1-247-855-00	CARBON	10K	5%	1/6W	
R089	1-247-847-00	CARBON	4.7K	5%	1/6W	
R090	1-247-861-00	CARBON	18K	5%	1/6W	
R091	1-247-861-00	CARBON	18K	5%	1/6W	
R092	1-247-847-00	CARBON	4.7K	5%	1/6W	
R093	1-247-861-00	CARBON	18K	5%	1/6W	
R094	1-247-861-00	CARBON	18K	5%	1/6W	
R095	1-247-823-00	CARBON	470	5%	1/6W	
R096 ⚠	1-217-385-00	FUSIBLE	6.8	5%	1/4W	F
R097	1-247-823-00	CARBON	470	5%	1/6W	
R098	1-247-851-00	CARBON	6.8K	5%	1/6W	
R099	1-247-837-00	CARBON	1.8K	5%	1/6W	
R100	1-247-821-00	CARBON	390	5%	1/6W	
R101	1-247-859-00	CARBON	15K	5%	1/6W	
R102	1-247-857-00	CARBON	12K	5%	1/6W	
R103	1-247-863-00	CARBON	22K	5%	1/6W	
R104	1-247-852-00	CARBON	7.5K	5%	1/6W	
R105	1-247-853-00	CARBON	8.2K	5%	1/6W	
R106	1-247-843-00	CARBON	3.3K	5%	1/6W	
R107	1-247-835-00	CARBON	1.5K	5%	1/6W	
R108	1-247-857-00	CARBON	12K	5%	1/6W	
R109	1-247-864-00	CARBON	24K	5%	1/6W	
R110	1-247-871-00	CARBON	47K	5%	1/6W	
R111	1-247-861-00	CARBON	18K	5%	1/6W	
R112	1-247-859-00	CARBON	15K	5%	1/6W	
R113	1-247-837-00	CARBON	1.8K	5%	1/6W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R114	1-247-851-00	CARBON	6.8K	5%	1/6W	
R115	1-247-875-00	CARBON	68K	5%	1/6W	
R116	1-247-821-00	CARBON	390	5%	1/6W	
R117	1-247-807-00	CARBON	100	5%	1/6W	
R118	1-247-824-00	CARBON	510	5%	1/6W	
R119	1-247-855-00	CARBON	10K	5%	1/6W	
R120	1-215-433-00	METAL	3.3K	1%	1/6W	
R121	1-247-859-00	CARBON	15K	5%	1/6W	
R122	1-247-840-00	CARBON	2.4K	5%	1/6W	
R123	1-247-855-00	CARBON	10K	5%	1/6W	
R124	1-247-855-00	CARBON	10K	5%	1/6W	
R125	1-247-814-00	CARBON	200	5%	1/6W	
R126	1-247-843-00	CARBON	3.3K	5%	1/6W	
R127	1-247-834-00	CARBON	1.3K	5%	1/6W	
R128	1-247-858-00	CARBON	13K	5%	1/6W	
R129	1-247-838-00	CARBON	2K	5%	1/6W	
R130	1-247-834-00	CARBON	1.3K	5%	1/6W	
R131	1-247-858-00	CARBON	13K	5%	1/6W	
R132	1-247-895-00	CARBON	470K	5%	1/6W	
R133	1-247-855-00	CARBON	10K	5%	1/6W	
R134	1-247-865-00	CARBON	27K	5%	1/6W	
R135	1-247-833-00	CARBON	1.2K	5%	1/6W	
R136	1-247-825-00	CARBON	560	5%	1/6W	
R137	1-247-825-00	CARBON	560	5%	1/6W	
R138	1-247-824-00	CARBON	510	5%	1/6W	
R139	1-247-836-00	CARBON	1.6K	5%	1/6W	
R140	1-247-833-00	CARBON	1.2K	5%	1/6W	
R141	1-247-865-00	CARBON	27K	5%	1/6W	
R142	1-247-853-00	CARBON	8.2K	5%	1/6W	
R143	1-247-895-00	CARBON	470K	5%	1/6W	
R144	1-247-855-00	CARBON	10K	5%	1/6W	
R145	1-247-834-00	CARBON	1.3K	5%	1/6W	
R146	1-247-838-00	CARBON	2K	5%	1/6W	
R147	1-247-858-00	CARBON	13K	5%	1/6W	
R148	1-247-858-00	CARBON	13K	5%	1/6W	
R149	1-247-834-00	CARBON	1.3K	5%	1/6W	
R150	1-247-814-00	CARBON	200	5%	1/6W	
R151	1-247-843-00	CARBON	3.3K	5%	1/6W	
R152	1-247-855-00	CARBON	10K	5%	1/6W	
R153	1-247-855-00	CARBON	10K	5%	1/6W	
R154	1-247-855-00	CARBON	10K	5%	1/6W	
R155	1-247-824-00	CARBON	510	5%	1/6W	
R156	1-247-840-00	CARBON	2.4K	5%	1/6W	
R157	1-247-859-00	CARBON	15K	5%	1/6W	
R158	1-247-807-00	CARBON	100	5%	1/6W	
R159	1-215-433-00	METAL	3.3K	1%	1/6W	
R160	1-247-824-00	CARBON	510	5%	1/6W	
R161	1-247-853-00	CARBON	8.2K	5%	1/6W	
R162	1-247-871-00	CARBON	47K	5%	1/6W	
R163	1-247-871-00	CARBON	47K	5%	1/6W	
R173	1-247-879-00	CARBON	100K	5%	1/6W	
R174	1-247-881-00	CARBON	120K	5%	1/6W	
R175	1-247-847-00	CARBON	4.7K	5%	1/6W	

Ref.No	Part No.	Description				Remark
R176	1-247-871-00	CARBON	47K	5%	1/6W	
R177	1-247-871-00	CARBON	47K	5%	1/6W	
R178	1-247-847-00	CARBON	4.7K	5%	1/6W	
R179	1-247-855-00	CARBON	10K	5%	1/6W	
R180	1-247-807-00	CARBON	100	5%	1/6W	
R181	1-247-855-00	CARBON	10K	5%	1/6W	
R183	1-247-871-00	CARBON	47K	5%	1/6W	
R184	1-249-421-11	CARBON	2.2K	5%	1/6W	
R185	1-247-807-00	CARBON	100	5%	1/6W	
R186	1-247-871-00	CARBON	47K	5%	1/6W	
R187	1-247-871-00	CARBON	47K	5%	1/6W	
R188	1-247-855-00	CARBON	10K	5%	1/6W	
R189	1-247-855-00	CARBON	10K	5%	1/6W	
R190	1-215-462-00	METAL	51K	1%	1/6W	
R191	1-247-879-00	CARBON	100K	5%	1/6W	
R192	1-247-879-00	CARBON	100K	5%	1/6W	
R193	1-215-446-00	METAL	11K	1%	1/6W	
R194	1-215-465-00	METAL	68K	1%	1/6W	
R195	1-215-465-00	METAL	68K	1%	1/6W	
R196	1-215-446-00	METAL	11K	1%	1/6W	
R197	1-215-462-00	METAL	51K	1%	1/6W	
R198	1-249-421-11	CARBON	2.2K	5%	1/6W	
R199	1-249-421-11	CARBON	2.2K	5%	1/6W	
R206	1-247-817-00	CARBON	270	5%	1/6W	
R207	1-247-827-00	CARBON	680	5%	1/6W	
R208	1-247-825-00	CARBON	560	5%	1/6W	
R209	1-247-819-00	CARBON	330	5%	1/6W	
R213	1-215-429-00	METAL	2.2K	1%	1/6W	
R214	1-249-421-11	CARBON	2.2K	5%	1/6W	
R218	1-215-429-00	METAL	2.2K	1%	1/6W	
R221	1-249-421-11	CARBON	2.2K	5%	1/6W	
R222	1-247-861-00	CARBON	18K	5%	1/6W	
R223	1-249-421-11	CARBON	2.2K	5%	1/6W	
R224	1-247-861-00	CARBON	18K	5%	1/6W	
R225	1-247-855-00	CARBON	10K	5%	1/6W	
R226	1-247-843-00	CARBON	3.3K	5%	1/6W	
R227	1-247-847-00	CARBON	4.7K	5%	1/6W	
R228	1-247-898-00	CARBON	620K	5%	1/6W	
R229	1-247-864-00	CARBON	24K	5%	1/6W	
R230	1-247-883-00	CARBON	150K	5%	1/6W	
R231	1-247-843-00	CARBON	3.3K	5%	1/6W	
R232	1-247-843-00	CARBON	3.3K	5%	1/6W	
R233	1-247-823-00	CARBON	470	5%	1/6W	
R234	1-247-827-00	CARBON	680	5%	1/6W	
R235	1-247-829-00	CARBON	820	5%	1/6W	
R236	1-247-847-00	CARBON	4.7K	5%	1/6W	
R237	1-247-847-00	CARBON	4.7K	5%	1/6W	
R238	1-247-815-00	CARBON	220	5%	1/6W	
R239	1-247-847-00	CARBON	4.7K	5%	1/6W	
R240	1-247-847-00	CARBON	4.7K	5%	1/6W	
R241	1-247-867-00	CARBON	33K	5%	1/6W	
R242	1-247-863-00	CARBON	22K	5%	1/6W	
R243	1-247-879-00	CARBON	100K	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R244	1-247-847-00	CARBON	4.7K	5%	1/6W	
R245	1-247-847-00	CARBON	4.7K	5%	1/6W	
R246 ⚠	**1-217-385-00**	**FUSIBLE**	**6.8**	**5%**	**1/4W**	**F**
R247	1-247-879-00	CARBON	100K	5%	1/6W	
R251	1-247-855-00	CARBON	10K	5%	1/6W	
R253	1-247-847-00	CARBON	4.7K	5%	1/6W	
R254	1-247-847-00	CARBON	4.7K	5%	1/6W	
R258	1-247-831-00	CARBON	1K	5%	1/6W	
R259	1-247-815-00	CARBON	220	5%	1/6W	
R260	1-215-436-00	METAL	4.3K	1%	1/6W	
R261	1-215-423-00	METAL	1.2K	1%	1/6W	
R262	1-247-849-00	CARBON	5.6K	5%	1/6W	
R263	1-247-849-00	CARBON	5.6K	5%	1/6W	
R264	1-247-849-00	CARBON	5.6K	5%	1/6W	
R265	1-247-849-00	CARBON	5.6K	5%	1/6W	
R266	1-247-847-00	CARBON	4.7K	5%	1/6W	
R267	1-247-855-00	CARBON	10K	5%	1/6W	
R268	1-247-847-00	CARBON	4.7K	5%	1/6W	
R269	1-247-849-00	CARBON	5.6K	5%	1/6W	
R270	1-247-847-00	CARBON	4.7K	5%	1/6W	
R271	1-247-855-00	CARBON	10K	5%	1/6W	
R272	1-247-841-00	CARBON	2.7K	5%	1/6W	
R273	1-247-849-00	CARBON	5.6K	5%	1/6W	
R274	1-247-871-00	CARBON	47K	5%	1/6W	
R275	1-247-871-00	CARBON	47K	5%	1/6W	
R276	1-247-871-00	CARBON	47K	5%	1/6W	
R277	1-247-871-00	CARBON	47K	5%	1/6W	
R278	1-247-855-00	CARBON	10K	5%	1/6W	
R279	1-247-855-00	CARBON	10K	5%	1/6W	
R282	1-215-415-00	METAL	560	1%	1/6W	
R287	1-215-453-00	METAL	22K	1%	1/6W	
R289	1-215-453-00	METAL	22K	1%	1/6W	
R290	1-215-461-00	METAL	47K	1%	1/6W	
R291	1-215 485-00	METAL	470K	1%	1/6W	
R292	1-215-485-00	METAL	470K	1%	1/6W	

VARIABLE RESISTOR

Ref.No	Part No.	Description
RV001	1-228-993-00	RES, ADJ, CARBON 4.7K
RV002	1-228-993-00	RES, ADJ, CARBON 4.7K
RV003	1-228-990-00	RES, ADJ, CARBON 1K
RV006	1-228-991-00	RES, ADJ, CARBON 2.2K
RV007	1-228-994-00	RES, ADJ, CARBON 10K
RV008	1-228-993-00	RES, ADJ, CARBON 4.7K
RV009	1-228-921-00	RES, ADJ, CARBON 4.7K
RV010	1-228-994-00	RES, ADJ, CARBON 10K
RV011	1-228-991-00	RES, ADJ, CARBON 2.2K
RV012	1-228-993-00	RES, ADJ, CARBON 4.7K
RV014	1-228-993-00	RES, ADJ, CARBON 4.7K
RV015	1-228-993-00	RES, ADJ, CARBON 4.7K
RV016	1-228-990-00	RES, ADJ, CARBON 1K
RV017	1-228-995-00	RES, ADJ, MATAL GLAZE 22K
RV018	1-228-995-00	RES, ADJ, MATAL GLAZE 22K

SWITCH

Ref.No	Part No.	Description	Remark
S001	1-570-283-11	SWITCH, SLIDE	

TRANSFORMER

Ref.No	Part No.	Description	Remark
T001	1-427-546-11	TRANSFORMER, I/O	
T002	1-427-546-11	TRANSFORMER, I/O	

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*A-6715-282-A SA-9 BOARD, COMPLETE (EC MODEL)
****

*A-6715-284-A SA-9 BOARD, COMPLETE (AS MODEL)
****

*3-681-170-00 HEAT SINK, S

CAPACITOR

Ref.No	Part No.	Description				Remark
C301	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C302	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C304	1-131-357-00	TANTALUM	4.7MF	20%	25V	
C305	1-131-357-00	TANTALUM	4.7MF	20%	25V	
C306	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C307	1-123-308-00	ELECT	220MF	20%	10V	
C308	1-123-330-00	ELECT	22MF	20%	16V	
C309	1-130-493-00	MYLAR	0.068MF	5%	50V	
C310	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C312	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C313	1-123-332-00	ELECT	47MF	20%	16V	
C314	1-123-356-00	ELECT	10MF	20%	16V	
C316	1-161-025-00	CERAMIC	0.1MF	10%	25V	
C317	1-102-122-00	CERAMIC	0.0027MF	10%	50V	
C318	1-161-039-00	CERAMIC	0.001MF	10%	25V	
C319	1-123-381-00	ELECT	2.2MF	20%	50V	
C320	1-130-489-00	MYLAR	0.033MF	5%	50V	
C321	1-136-153-00	MYLAR	0.01MF	10%	50V	
C322	1-127-450-91	ELECT(SOLID)	0.33MF	10%	25V	
C323	1-123-381-00	ELECT	2.2MF	20%	50V	
C324	1-130-491-00	MYLAR	0.047MF	5%	50V	
C325	1-130-491-00	MYLAR	0.047MF	5%	50V	
C326	1-130-491-00	MYLAR	0.047MF	5%	50V	
C327	1-123-356-00	ELECT	10MF	20%	16V	
C328	1-130-491-00	MYLAR	0.047MF	5%	50V	
C329	1-130-489-00	MYLAR	0.033MF	5%	50V	
C330	1-130-489-00	MYLAR	0.033MF	5%	50V	
C331	1-123-356-00	ELECT	10MF	20%	16V	
C332	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C333	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C334	1-123-369-00	ELECT	4.7MF	20%	25V	
C335	1-123-369-00	ELECT	4.7MF	20%	25V	
C336	1-130-491-00	MYLAR	0.047MF	5%	50V	
C337	1-123-369-00	ELECT	4.7MF	20%	25V	
C338	1-123-356-00	ELECT	10MF	20%	16V	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C339	1-161-057-00	CERAMIC	0.033MF	10%	25V
C340	1-123-307-00	ELECT	100MF	20%	10V
C341	1-136-153-00	MYLAR	0.01MF	10%	50V
C342	1-136-153-00	MYLAR	0.01MF	10%	50V
C343	1-130-495-00	MYLAR	0.1MF	5%	50V
C345	1-130-489-00	MYLAR	0.033MF	5%	50V
C346	1-123-608-00	ELECT	0.22MF	20%	50V
C348	1-130-467-00	MYLAR	470PF	5%	50V
C349	1-161-057-00	CERAMIC	0.033MF	10%	25V
C350	1-102-824-00	CERAMIC	470PF	5%	50V
C351	1-123-356-00	ELECT	10MF	20%	16V
C352	1-161-059-00	CERAMIC	0.047MF	10%	25V
C353	1-123-333-00	ELECT	100MF	20%	16V
C354	1-123-343-00	ELECT	33MF	20%	25V
C356	1-123-381-00	ELECT	2.2MF	20%	50V
C357	1-161-057-00	CERAMIC	0.033MF	10%	25V
C359	1-123-343-00	ELECT	33MF	20%	25V
C360	1-161-013-00	CERAMIC	0.01MF	10%	25V
C361	1-161-013-00	CERAMIC	0.01MF	10%	25V
C362	1-161-013-00	CERAMIC	0.01MF	10%	25V
C363	1-123-380-00	ELECT	1MF	20%	50V
C364	1-161-057-00	CERAMIC	0.033MF	10%	25V
C365	1-123-356-00	ELECT	10MF	20%	16V
C366	1-123-318-00	ELECT	33MF	20%	10V
C367	1-123-356-00	ELECT	10MF	20%	16V
C368	1-123-356-00	ELECT	10MF	20%	16V
C369	1-123-356-00	ELECT	10MF	20%	16V
C370	1-123-307-00	ELECT	100MF	20%	10V
C372	1-161-057-00	CERAMIC	0.033MF	10%	25V
C373	1-123-356-00	ELECT	10MF	20%	16V
C374	1-130-467-00	MYLAR	470PF	5%	50V
C375	1-136-141-00	FILM	0.001MF	5%	50V
C376	1-123-333-00	ELECT	100MF	20%	16V
C377	1-123-333-00	ELECT	100MF	20%	16V
C378	1-123-332-00	ELECT	47MF	20%	16V
C379	1-130-479-00	MYLAR	0.0047MF	5%	50V
C380	1-123-332-00	ELECT	47MF	20%	16V
C381	1-161-057-00	CERAMIC	0.033MF	10%	25V
C382	1-123-381-00	ELECT	2.2MF	20%	50V
C383	1-161-057-00	CERAMIC	0.033MF	10%	25V
C384	1-161-013-00	CERAMIC	0.01MF	10%	25V
C385	1-161-013-00	CERAMIC	0.01MF	10%	25V
C386	1-123-381-00	ELECT	2.2MF	20%	50V
C387	1-123-381-00	ELECT	2.2MF	20%	50V
C501	1-123-380-00	ELECT	1MF	20%	50V
C502	1-130-483-00	MYLAR	0.01MF	5%	50V
C503	1-130-474-00	MYLAR	0.0018MF	5%	50V
C504	1-123-318-00	ELECT	33MF	20%	16V
C505	1-123-356-00	ELECT	10MF	20%	16V
C506	1-123-380-00	ELECT	1MF	20%	50V
C507	1-130-481-00	MYLAR	0.0068MF	5%	50V
C508	1-123-380-00	ELECT	1MF	20%	50V
C510	1-102-111-00	CERAMIC	270PF	10%	50V

Ref.No	Part No.	Description			Remark
C511	1-123-380-00	ELECT	1MF	20%	50V
C513	1-123-330-00	ELECT	22MF	20%	16V
C514	1-123-306-00	ELECT	47MF	20%	6.3V
C515	1-123-356-00	ELECT	10MF	20%	16V
C516	1-130-493-00	MYLAR	0.068MF	5%	50V
C517	1-161-013-00	CERAMIC	0.01MF	10%	25V
C518	1-161-055-00	CERAMIC	0.022MF	10%	25V
C519	1-123-332-00	ELECT	47MF	20%	16V
C520	1-107-166-00	MICA	62PF	5%	500V
C521	1-136-215-00	FILM	0.0068MF	10%	400V
C522	1-123-369-00	ELECT	4.7MF	20%	50V
C523	1-123-380-00	ELECT	1MF	20%	50V
C524	1-123-318-00	ELECT	33MF	20%	16V
C525	1-161-040-00	CERAMIC	0.0012MF	10%	25V
C527	1-123-330-00	ELECT	22MF	20%	16V
C528	1-123-380-00	ELECT	1MF	20%	50V
C529	1-130-484-00	MYLAR	0.012MF	5%	50V
C601	1-102-518-00	CERAMIC	33PF	5%	50V
C602	1-102-518-00	CERAMIC	33PF	5%	50V
C604	1-161-025-00	CERAMIC	0.1MF	10%	25V
C605	1-123-318-00	ELECT	33MF	20%	10V
C608	1-123-308-00	ELECT	220MF	20%	10V
C611	1-123-330-00	ELECT	22MF	20%	16V
C612	1-161-055-00	CERAMIC	0.022MF	10%	25V
C613	1-161-059-00	CERAMIC	0.047MF	10%	25V
C615	1-161-059-00	CERAMIC	0.047MF	10%	25V
C616	1-129-794-00	FILM	0.0033MF	5%	100V
C617	1-129-794-00	FILM	0.0033MF	2%	100V
C618	1-123-306-00	ELECT	47MF	20%	10V
C620	1-123-381-00	ELECT	2.2MF	20%	50V

FILTER

Ref.No	Part No.	Description
CF601	1-527-992-11	OSCILLATOR, CERAMIC

CONNECTOR

Ref.No	Part No.	Description
CN301	*1-560-891-00	PIN, CONNECTOR 3P
CN302	*1-560-466-00	PIN, CONNECTOR 3P
CN303	*1-560-892-00	PIN, CONNECTOR 4P
CN304	*1-560-892-00	PIN, CONNECTOR 4P
CN305	*1-560-890-00	PIN, CONNECTOR 2P
CN306	*1-560-893-00	PIN, CONNECTOR 5P
CN307	*1-560-890-00	PIN, CONNECTOR 2P
CN308	*1-560-895-00	PIN, CONNECTOR 7P
CN309	*1-560-891-00	PIN, CONNECTOR 3P
CN310	*1-560-891-00	PIN, CONNECTOR 3P
CN311	*1-560-892-00	PIN, CONNECTOR 4P
CN501	*1-560-893-00	PIN, CONNECTOR 5P
CN502	*1-560-893-00	PIN, CONNECTOR 5P
CN601	*1-560-893-00	PIN, CONNECTOR 5P
CN602	*1-560-900-00	PIN, CONNECTOR 12P
CN603	*1-560-890-00	PIN, CONNECTOR 2P
CN604	*1-560-890-00	PIN, CONNECTOR 2P
CN605	*1-560-900-00	PIN, CONNECTOR 12P

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
CN606	*1-560-890-00	PIN, CONNECTOR 2P	
CN607	*1-560-891-00	PIN, CONNECTOR 3P	
CN608	*1-560-890-00	PIN, CONNECTOR 2P	
CN609	*1-560-894-00	PIN, CONNECTOR 6P	
CN610	*1-560-895-00	PIN, CONNECTOR 7P	
CN611	*1-560-891-00	PIN, CONNECTOR 3P	
CN612	*1-560-891-00	PIN, CONNECTOR 3P	
		DIODE	
D301	8-719-911-19	DIODE 1SS119	
D302	8-719-191-07	DIODE RD9.1E-B	
D303	8-719-000-06	DIODE MC921	
D304	8-719-000-04	DIODE MC911	
D305	8-719-101-50	DIODE RD5.1EL2	
D306	8-719-911-19	DIODE 1SS119	
D307	8-719-911-19	DIODE 1SS119	
D308	8-719-000-06	DIODE MC921	
D311	8-719-000-06	DIODE MC921	
D501	8-719-000-06	DIODE MC921	
D601	8-719-000-06	DIODE MC921	
D602	8-719-000-06	DIODE MC921	
D603	8-719-000-04	DIODE MC911	
D604	8-719-911-19	DIODE 1SS119	
D606	8-719-168-07	DIODE RD6.8E-B	
D609	8-719-911-19	DIODE 1SS119	
D610	8-719-168-07	DIODE RD6.8E-B	
D611	8-719-168-07	DIODE RD6.8E-B	
		IC	
IC301	8-752-012-40	IC CX20124	
IC302	8-759-135-80	IC UPC358C	
IC303	8-759-145-58	IC UPC4558C	
IC304	8-759-918-61	IC MB88201-191G	
IC305	8-759-135-80	IC UPC358C	
IC306	8-759-135-80	IC UPC358C	
IC307	8-759-240-66	IC TC4066BP	
IC501	8-759-915-38	IC BA5116	
IC502	8-759-101-73	IC UPC1513HA	
IC601	8-759-915-87	IC MB88551-150M	
IC602	8-759-800-72	IC LA7205	
IC603	8-759-600-24	IC M54543L	
		COIL	
L301	1-408-417-00	MICRO INDUCTOR 47UH	
L302	1-408-421-00	MICRO INDUCTOR 100UH	
L501	1-408-222-00	MICRO INDUCTOR 27MMH	
L502	1-408-221-00	MICRO INDUCTOR 22MMH	
L503	1-407-710-00	MICRO INDUCTOR 270UH	
L601	1-407-717-00	MICRO INDUCTOR 1MMH	
		IC LINK	
PS301	⚠1-532-727-11	LINK, IC	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
PS302	⚠1-532-679-00	LINK, IC	
PS303	⚠1-532-637-00	LINK, IC	
PS304	⚠1-532-637-00	LINK, IC	
		TRANSISTOR	
Q302	8-729-900-89	TRANSISTOR DTC144ES	
Q303	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q304	8-729-900-89	TRANSISTOR DTC144ES	
Q305	8-729-900-74	TRANSISTOR DTC143TS	
Q306	8-729-900-89	TRANSISTOR DTC144ES	
Q307	8-729-245-83	TRANSISTOR 2SC2458	
Q308	8-729-245-83	TRANSISTOR 2SC2458	
Q309	8-729-245-83	TRANSISTOR 2SC2458	
Q310	8-729-177-43	TRANSISTOR 2SD774	
Q312	8-729-245-83	TRANSISTOR 2SC2458	
Q313	8-729-900-89	TRANSISTOR DTC144ES	
Q314	8-729-245-83	TRANSISTOR 2SC2458	
Q315	8-729-245-83	TRANSISTOR 2SC2458	
Q316	8-729-245-83	TRANSISTOR 2SC2458	
Q317	8-729-245-83	TRANSISTOR 2SC2458	
Q318	8-729-245-83	TRANSISTOR 2SC2458	
Q319	8-729-316-16	TRANSISTOR 2SC1061	
Q320	8-729-245-83	TRANSISTOR 2SC2458	
Q321	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q322	8-729-245-83	TRANSISTOR 2SC2458	
Q323	8-729-245-83	TRANSISTOR 2SC2458	
Q324	8-729-245-83	TRANSISTOR 2SC2458	
Q325	8-729-373-92	TRANSISTOR 2SB739	
Q326	8-729-245-83	TRANSISTOR 2SC2458	
Q327	8-729-245-83	TRANSISTOR 2SC2458	
Q328	8-729-178-54	TRANSISTOR 2SC2785-F	
Q329	8-729-900-89	TRANSISTOR DTC144ES	
Q330	8-729-900-89	TRANSISTOR DTC144ES	
Q332	8-729-245-83	TRANSISTOR 2SC2458	
Q333	8-729-316-16	TRANSISTOR 2SC1061	
Q334	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q335	8-729-245-83	TRANSISTOR 2SC2458	
Q336	8-729-245-83	TRANSISTOR 2SC2458	
Q337	8-729-900-89	TRANSISTOR DTC144ES	
Q338	8-729-900-61	TRANSISTOR DTA114ES	
Q339	8-729-900-89	TRANSISTOR DTC144ES	
Q343	8-729-900-89	TRANSISTOR DTC144ES	
Q345	8-729-900-65	TRANSISTOR DTA144ES	
Q346	8-729-245-83	TRANSISTOR 2SC2458	
Q349	8-729-900-89	TRANSISTOR DTC144ES	
Q350	8-729-900-89	TRANSISTOR DTC144ES	
Q351	8-729-900-89	TRANSISTOR DTC144ES	
Q352	8-729-245-83	TRANSISTOR 2SC2458	
Q353	8-729-245-83	TRANSISTOR 2SC2458	
Q354	8-729-245-83	TRANSISTOR 2SC2458	
Q355	8-729-900-89	TRANSISTOR DTC144ES	
Q501	8-729-177-43	TRANSISTOR 2SD774	
Q502	8-729-173-37	TRANSISTOR 2SA733-P	

Ref.No	Part No.	Description				Remark
Q503	8-729 900-89	TRANSISTOR DTC144ES				
Q504	8-729-900-36	TRANSISTOR DTC124ES				
Q505	8-729-245-83	TRANSISTOR 2SC2458				
Q506	8-729-245-83	TRANSISTOR 2SC2458				
Q507	8-729-245-83	TRANSISTOR 2SC2458				
Q508	8-729-245-83	TRANSISTOR 2SC2458				
Q509	8-729-178-54	TRANSISTOR 2SC2785				
Q601	8-729-116-42	TRANSISTOR 2SD1164-L				
Q602	8-729-116-42	TRANSISTOR 2SD1164-L				
Q603	8-729-177-43	TRANSISTOR 2SD-774				
Q604	8-729-177-43	TRANSISTOR 2SD-774				
Q609	8-729-900-89	TRANSISTOR DTC144ES				
Q610	8-729 245-83	TRANSISTOR 2SC2458				
Q611	8-729-900-89	TRANSISTOR DTC144ES				
Q615	8-729-204-83	TRANSISTOR 2SA1-48-GR				
Q616	8-729-245-83	TRANSISTOR 2SC2458				
Q617	8-729-245-83	TRANSISTOR 2SC2458				
Q618	8-729-900-85	TRANSISTOR DTC144WS				
Q619	8-729 900-89	TRANSISTOR DTC144ES				
		RESISTOR				
R301	1-247-831-00	CARBON	1K	5%	1/6W	
R302	1-247-903-00	CARBON	1M	5%	1/6W	
R303	1-247-855-00	CARBON	10K	5%	1/6W	
R304	1-247-855-00	CARBON	10K	5%	1/6W	
R305	1-247-831-00	CARBON	1K	5%	1/6W	
R306	1-247-903-00	CARBON	1M	5%	1/6W	
R307	1-247-815-00	CARBON	220	5%	1/6W	
R308	1-247-845-00	CARBON	3.9K	5%	1/6W	
R309	1-247-843-00	CARBON	3.3K	5%	1/6W	
R310	1-247-843-00	CARBON	3.3K	5%	1/6W	
R311	1-247-831-00	CARBON	1K	5%	1/6W	
R312	1-247-863-00	CARBON	22K	5%	1/6W	
R313	1-247-879-00	CARBON	100K	5%	1/6W	
R314	1-247-879-00	CARBON	100K	5%	1/6W	
R315	1-247-855-00	CARBON	10K	5%	1/6W	
R316 ⚠	1-217-383-00	FUSIBLE	4.7	5%	1/4W	F
R317	1-247-844-00	CARBON	3.6K	5%	1/6W	
R318	1-247-867-00	CARBON	33K	5%	1/6W	
R319	1-247-859-00	CARBON	15K	5%	1/6W	
R320	1-247-843-00	CARBON	3.3K	5%	1/6W	
R321	1-247-831-00	CARBON	1K	5%	1/6W	
R322	1-247-871-00	CARBON	47K	5%	1/6W	
R323	1-249-421-11	CARBON	2.2K	5%	1/6W	
R324	1-247-859-00	CARBON	15K	5%	1/6W	
R325	1-247-879-00	CARBON	100K	5%	1/6W	
R326	1-247-879-00	CARBON	100K	5%	1/6W	
R327	1-247-843-00	CARBON	3.3K	5%	1/6W	
R328	1-247-855-00	CARBON	10K	5%	1/6W	
R329	1-247-855-00	CARBON	10K	5%	1/6W	
R330	1-247-855-00	CARBON	10K	5%	1/6W	
R332	1-247-855-00	CARBON	10K	5%	1/6W	
R334	1-247-867-00	CARBON	33K	5%	1/6W	

Ref.No	Part No.	Description				Remark
R335	1-247-807-00	CARBON	100	5%	1/6W	
R337	1-247-851-00	CARBON	6.8K	5%	1/6W	
R338	1-247-851-00	CARBON	6.8K	5%	1/6W	
R339	1-247-855-00	CARBON	10K	5%	1/6W	
R340	1-247-859-00	CARBON	15K	5%	1/6W	
R341	1-247-855-00	CARBON	10K	5%	1/6W	
R342	1-247-881-00	CARBON	120K	5%	1/6W	
R343	1-247-879-00	CARBON	100K	5%	1/6W	
R345	1-247-863-00	CARBON	22K	5%	1/6W	
R346	1-215-477-00	METAL	220K	1%	1/6W	
R347	1-215-479-91	METAL	270K	1%	1/6W	
R348	1-247-871-00	CARBON	47K	5%	1/6W	
R349	1-247-879-00	CARBON	100K	5%	1/6W	
R350	1-247-863-00	CARBON	22K	5%	1/6W	
R351	1-247-863-00	CARBON	22K	5%	1/6W	
R353	1-247-859-00	CARBON	15K	5%	1/6W	
R354	1-247-857-00	CARBON	12K	5%	1/6W	
R356	1-247-871-00	CARBON	47K	5%	1/6W	
R357	1-215-467-00	METAL	82K	1%	1/6W	
R358	1-247-875-00	CARBON	68K	5%	1/6W	
R359	1-247-853-00	CARBON	8.2K	5%	1/6W	
R360	1-247-855-00	CARBON	10K	5%	1/6W	
R361	1-247-831-00	CARBON	1K	5%	1/6W	
R363	1-247-887-00	CARBON	220K	5%	1/6W	
R364	1-247-881-00	CARBON	120K	5%	1/6W	
R365	1-247-859-00	CARBON	15K	5%	1/6W	
R366	1-247-837-00	CARBON	1.8K	5%	1/6W	
R367	1-249-421-11	CARBON	2.2K	5%	1/6W	
R368	1-247-863-00	CARBON	22K	5%	1/6W	
R369	1-247-883-00	CARBON	150K	5%	1/6W	
R370	1-247-873-00	CARBON	56K	5%	1/6W	
R371	1-247-903-00	CARBON	1M	5%	1/6W	
R372	1-247-841-00	CARBON	2.7K	5%	1/6W	
R373	1-247-895-00	CARBON	470K	5%	1/6W	
R374	1-247-889-00	CARBON	270K	5%	1/6W	
R375	1-247-903-00	CARBON	1M	5%	1/6W	
R376	1-247-871-00	CARBON	47K	5%	1/6W	
R377	1-247-871-00	CARBON	47K	5%	1/6W	
R378	1-247-871-00	CARBON	47K	5%	1/6W	
R379	1-247-845-00	CARBON	3.9K	5%	1/6W	
R380	1-247-849-00	CARBON	5.6K	5%	1/6W	
R381	1-247-867-00	CARBON	33K	5%	1/6W	
R382	1-247-849-00	CARBON	5.6K	5%	1/6W	
R383	1-247-859-00	CARBON	15K	5%	1/6W	
R384	1-247-867-00	CARBON	33K	5%	1/6W	
R385	1-247-891-00	CARBON	330K	5%	1/6W	
R386	1-247-845-00	CARBON	3.9K	5%	1/6W	
R387	1-247-855-00	CARBON	10K	5%	1/6W	
R388	1-247-819-00	CARBON	330	5%	1/6W	
R389	1-247-832-00	CARBON	1.1K	5%	1/6W	
R390	1-247-871-00	CARBON	47K	5%	1/6W	
R391	1-247-871-00	CARBON	47K	5%	1/6W	
R392	1-247-859-00	CARBON	15K	5%	1/6W	

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Ref.No	Part No.	Description				Remark
R393	1-247-848-00	CARBON	5.1K	5%	1/6W	
R394	1-247-831-00	CARBON	1K	5%	1/6W	
R395	1-247-855-00	CARBON	10K	5%	1/6W	
R396	1-247-871-00	CARBON	47K	5%	1/6W	
R397 ⚠	1-212-366-00	METAL OXIDE	3.3	5%	1W	F
R398	1-247-863-00	CARBON	22K	5%	1/6W	
R399	1-247-867-00	CARBON	33K	5%	1/6W	
R400	1-247-831-00	CARBON	1K	5%	1/6W	
R401	1-247-863-00	CARBON	22K	5%	1/6W	
R402	1-247-871-00	CARBON	47K	5%	1/6W	
R405	1-247-871-00	CARBON	47K	5%	1/6W	
R407	1-247-831-00	CARBON	1K	5%	1/6W	
R408	1-247-823-00	CARBON	470	5%	1/6W	
R411 ⚠	1-212-360-00	METAL OXIDE	1	5%	1W	F
R412 ⚠	1-217-383-00	FUSIBLE	4.7	5%	1/4W	F
R414 ⚠	1-212-360-00	METAL OXIDE	1	5%	1W	F
R420	1-247-855-00	CARBON	10K	5%	1/6W	
R421	1-247-887-00	CARBON	220K	5%	1/6W	
R422	1-215-463-00	METAL	56K	1%	1/6W	
R423	1-247-831-00	CARBON	1K	5%	1/6W	
R424	1-247-855-00	CARBON	10K	5%	1/6W	
R426	1-247-829-00	CARBON	820	5%	1/6W	
R427	1-247-855-00	CARBON	10K	5%	1/6W	
R428	1-247-835-00	CARBON	1.5K	5%	1/6W	
R429	1-247-881-00	CARBON	120K	5%	1/6W	
R430	1-247-863-00	CARBON	22K	5%	1/6W	
R431	1-247-863-00	CARBON	22K	5%	1/6W	
R432	1-247-831-00	CARBON	1K	5%	1/6W	
R433	1-247-835-00	CARBON	1.5K	5%	1/6W	
R434	1-247-903-00	CARBON	1M	5%	1/6W	
R435	1-247-829-00	CARBON	820	5%	1/6W	
R436	1-247-879-00	CARBON	100K	5%	1/6W	
R437	1-247-835-00	CARBON	1.5K	5%	1/6W	
R438	1-247-885-00	CARBON	180K	5%	1/6W	
R440	1-247-859-00	CARBON	15K	5%	1/6W	
R441	1-247-831-00	CARBON	1K	5%	1/6W	
R442	1-247-855-00	CARBON	10K	5%	1/6W	
R443	1-247-803-00	CARBON	68	5%	1/6W	
R446	1-247-855-00	CARBON	10K	5%	1/6W	
R447	1-247-879-00	CARBON	100K	5%	1/6W	
R448	1-247-863-00	CARBON	22K	5%	1/6W	
R449	1-247-863-00	CARBON	22K	5%	1/6W	
R450	1-249-421-11	CARBON	2.2K	5%	1/6W	
R451	1-247-851-00	CARBON	6.8K	5%	1/6W	
R452	1-247-843-00	CARBON	3.3K	5%	1/6W	
R453	1-247-865-00	CARBON	27K	5%	1/6W	
R454	1-247-855-00	CARBON	10K	5%	1/6W	
R455	1-247-855-00	CARBON	10K	5%	1/6W	
R456	1-247-853-00	CARBON	8.2K	5%	1/6W	
R458	1-247-855-00	CARBON	10K	5%	1/6W	
R459	1-247-841-00	CARBON	2.7K	5%	1/6W	
R501	1-247-827-00	CARBON	680	5%	1/6W	
R502	1-247-885-00	CARBON	180K	5%	1/6W	

Ref.No	Part No.	Description				Remark
R503	1-247-859-00	CARBON	15K	5%	1/6W	
R504	1-247-829-00	CARBON	820	5%	1/6W	
R505	1-247-879-00	CARBON	100K	5%	1/6W	
R506	1-247-859-00	CARBON	15K	5%	1/6W	
R507	1-247-829-00	CARBON	820	5%	1/6W	
R508	1-247-831-00	CARBON	1K	5%	1/6W	
R509	1-247-859-00	CARBON	15K	5%	1/6W	
R511	1-247-851-00	CARBON	6.8K	5%	1/6W	
R512	1-247-833-00	CARBON	1.2K	5%	1/6W	
R513	1-247-843-00	CARBON	3.3K	5%	1/6W	
R515	1-247-903-00	CARBON	1M	5%	1/6W	
R516	1-247-883-00	CARBON	150K	5%	1/6W	
R517	1-247-867-00	CARBON	33K	5%	1/6W	
R519	1-247-875-00	CARBON	68K	5%	1/6W	
R520	1-247-825-00	CARBON	560	5%	1/6W	
R522	1-247-875-00	CARBON	68K	5%	1/6W	
R523	1-247-855-00	CARBON	10K	5%	1/6W	
R524	1-247-855-00	CARBON	10K	5%	1/6W	
R526	1-247-847-00	CARBON	4.7K	5%	1/6W	
R527	1-247-867-00	CARBON	33K	5%	1/6W	
R528	1-247-859-00	CARBON	15K	5%	1/6W	
R529	1-247-077-00	CARBON	3.3	5%	1/4W	
R530 ⚠	1-212-966-00	FUSIBLE	22	5%	1/2W	F
R531	1-247-855-00	CARBON	10K	5%	1/6W	
R532	1-247-855-00	CARBON	10K	5%	1/6W	
R533	1-247-871-00	CARBON	47K	5%	1/6W	
R534	1-247-871-00	CARBON	47K	5%	1/6W	
R535	1-247-847-00	CARBON	4.7K	5%	1/6W	
R536	1-247-847-00	CARBON	4.7K	5%	1/6W	
R537	1-247-783-00	CARBON	10	5%	1/6W	
R538	1-247-863-00	CARBON	22K	5%	1/6W	
R539	1-247-863-00	CARBON	22K	5%	1/6W	
R540	1-247-855-00	CARBON	10K	5%	1/6W	
R541	1-247-879-00	CARBON	100K	5%	1/6W	
R601	1-247-864-00	CARBON	24K	5%	1/6W	
R602	1-247-851-00	CARBON	6.8K	5%	1/6W	
R603	1-247-855-00	CARBON	10K	5%	1/6W	
R604	1-247-861-00	CARBON	18K	5%	1/6W	
R605	1-247-873-00	CARBON	56K	5%	1/6W	
R606	1-247-861-00	CARBON	18K	5%	1/6W	
R607	1-247-862-00	CARBON	20K	5%	1/6W	
R608	1-247-807-00	CARBON	100	5%	1/6W	
R609	1-247-875-00	CARBON	68K	5%	1/6W	
R610	1-247-855-00	CARBON	10K	5%	1/6W	
R611	1-247-855-00	CARBON	10K	5%	1/6W	
R612	1-247-843-00	CARBON	3.3K	5%	1/6W	
R613	1-247-843-00	CARBON	3.3K	5%	1/6W	
R614	1-247-845-00	CARBON	3.9K	5%	1/6W	
R615	1-247-855-00	CARBON	10K	5%	1/6W	
R616	1-247-845-00	CARBON	3.9K	5%	1/6W	
R617	1-247-855-00	CARBON	10K	5%	1/6W	
R618	1-247-843-00	CARBON	3.3K	5%	1/6W	
R619	1-247-855-00	CARBON	10K	5%	1/6W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R620	1-247-843-00	CARBON	3.3K	5%	1/6W	
R622	1-247-864-00	CARBON	24K	5%	1/6W	
R623	1-247-864-00	CARBON	24K	5%	1/6W	
R625	1-247-887-00	CARBON	220K	5%	1/6W	
R640	1-247-855-00	CARBON	10K	5%	1/6W	
R641	1-247-843-00	CARBON	3.3K	5%	1/6W	
R645	1-247-843-00	CARBON	3.3K	5%	1/6W	
R651	1-247-843-00	CARBON	3.3K	5%	1/6W	
R652	1-247-835-00	CARBON	1.5K	5%	1/6W	
R653	1-247-871-00	CARBON	47K	5%	1/6W	
R654	1-247-871-00	CARBON	47K	5%	1/6W	
R656	1-247-855-00	CARBON	10K	5%	1/6W	
R657	1-247-855-00	CARBON	10K	5%	1/6W	
R658	1-247-855-00	CARBON	10K	5%	1/6W	
R659	1-247-855-00	CARBON	10K	5%	1/6W	
R660	1-247-855-00	CARBON	10K	5%	1/6W	
R661	1-247-855-00	CARBON	10K	5%	1/6W	

VARIABLE RESISTOR

RV301	1-228-996-00	RES, ADJ, CARBON 47K
RV302	1-228-996-00	RES, ADJ, CARBON 47K
RV303	1-228-997-00	RES, ADJ, METAL GLAZE 100K
RV304	1-228-997-00	RES, ADJ, CARBON 100K
RV305	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV306	1-228-995-00	RES, ADJ, METAL GLAZE 22K
RV307	1-228-995-00	RES, ADJ, METAL GLAZE 22K
RV308	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV309	1-228-990-00	RES, ADJ, METAL GLAZE 1K
RV501	1-228-995-00	RES, ADJ, CARBON 22K
RV502	1-228-999-00	RES, ADJ, METAL GLAZE 470K

TRANSFORMER

T501	1-433-275-00	TRANSFORMER, BIAS OSCILLATOR

LEAD PIN

TP301	*3-846-049-11	PIN, LEAD
TP303	*3-846-049-11	PIN, LEAD
TP304	*3-846-049-11	PIN, LEAD
TP305	*3-846-049-11	PIN, LEAD
TP306	*3-846-049-11	PIN, LEAD
TP309	*3-846-049-11	PIN, LEAD
TP501	*3-846-049-11	PIN, LEAD
TP502	*3-846-049-11	PIN, LEAD
TP503	*3-846-049-11	PIN, LEAD
TP603	*3-846-049-11	PIN, LEAD

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*A-6717-410-A FU-37 BOARD, COMPLETE
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CAPACITOR

Ref.No	Part No.	Description				Remark
C001	1-123-356-00	ELECT	10MF	20%	16V	
C002	1-123-306-00	ELECT	47MF	20%	10V	
C003	1-123-369-00	ELECT	4.7MF	20%	25V	
C005	1-123-616-00	ELECT	4.7MF	20%	25V	
C006	1-123-380-00	ELECT	1MF	20%	50V	
C007	1-123-611-00	ELECT	1MF	20%	50V	
C009	1-161-043-00	CERAMIC	0.0022MF	10%	25V	
C010	1-102-973-00	CERAMIC	100PF	10%	50V	
C011	1-102-973-00	CERAMIC	100PF	10%	50V	
C012	1-101-004-00	CERAMIC	0.01MF		50V	

DIODE

D001	8-719-908-50	DIODE SLR-54MC3
D002	8-719-911-19	DIODE 1SS119

IC

IC001	8-759-745-56	IC NJM4556D

COIL

L002	1-408-600-00	MICRO INDUCTOR 5.6UH

RESISTOR

R001	1-247-708-11	CARBON	470	5%	1/4W
R002	1-247-851-00	CARBON	6.8K	5%	1/6W
R003	1-247-855-00	CARBON	10K	5%	1/6W
R004	1-247-851-00	CARBON	6.8K	5%	1/6W
R005	1-247-855-00	CARBON	10K	5%	1/6W
R006	1-247-861-00	CARBON	18K	5%	1/6W
R007	1-247-855-00	CARBON	10K	5%	1/6W
R008	1-247-799-00	CARBON	47	5%	1/6W
R009	1-247-867-00	CARBON	33K	5%	1/6W
R010	1-247-877-00	CARBON	82K	5%	1/6W
R013	1-247-867-00	CARBON	33K	5%	1/6W
R014	1-247-877-00	CARBON	82K	5%	1/6W
R015	1-247-887-00	CARBON	220K	5%	1/6W
R016	1-247-887-00	CARBON	220K	5%	1/6W
R017	1-247-887-00	CARBON	220K	5%	1/6W
R018	1-247-887-00	CARBON	220K	5%	1/6W
R022	1-247-855-00	CARBON	10K	5%	1/6W

SWITCH

S001	1-554-174-00	SWITCH, KEY BOARD
S002	1-554-174-00	SWITCH, KEY BOARD
S003	1-554-174-00	SWITCH, KEY BOARD
S004	1-554-174-00	SWITCH, KEY BOARD
S005	1-554-174-00	SWITCH, KEY BOARD
S006	1-554-174-00	SWITCH, KEY BOARD
S007	1-554-174-00	SWITCH, KEY BOARD
S008	1-553-716-00	SWITCH, SLIDE
S009	1-553-716-00	SWITCH, SLIDE
S010	1-553-716-00	SWITCH, SLIDE
S011	1-553-754-00	SWITCH, SLIDE

When indicating parts by reference number, please include the board name.

FU-37 TU-73

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
RV001	1-230-856-11	RES, VAR, CARBON 50K	
RV002	1-230-431-11	RES, VAR, CARBON 100K	

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*A-6721-252-A TU-73 BOARD, COMPLETE
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Ref.No	Part No.	Description	Remark
	⚠ 1-463-577-31	TUNER, ET (BT-883AD)	
	*3-662-227-00	HOLDER (R-3), LED	
	*3-674-390-00	HOLDER (B), LED	

CAPACITOR

Ref.No	Part No.	Description			Remark
C001	1-102-527-00	CERAMIC	82PF	5%	50V
C002	1-102-529-00	CERAMIC	100PF	5%	50V
C003	1-102-949-00	CERAMIC	12PF	5%	50V
C004	1-102-523-00	CERAMIC	56PF	5%	50V
C005	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C006	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C007	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C008	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C009	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C010	1-123-369-00	ELECT	4.7MF	20%	25V
C011	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C012	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C013	1-161-059-00	CERAMIC	0.047MF	10%	25V
C014	1-123-379-00	ELECT	0.47MF	20%	50V
C015	1-123-333-00	ELECT	100MF	20%	16V
C016	1-101-004-00	CERAMIC	0.01MF		50V
C017	1-102-504-00	CERAMIC	4PF	0.25PF	50V
C018	1-102-963-00	CERAMIC	33PF	5%	50V
C019	1-102-529-00	CERAMIC	100PF	5%	50V
C020	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C021	1-123-286-00	ELECT	0.33MF	20%	50V
C022	1-101-004-00	CERAMIC	0.01MF		50V
C023	1-101-361-00	CERAMIC	150PF	5%	50V
C024	1-123-380-00	ELECT	1MF	20%	50V
C025	1-130-014-00	FILM	470PF	5%	50V
C026	1-161-055-00	CERAMIC	0.022MF	10%	25V
C027	1-161-055-00	CERAMIC	0.022MF	10%	25V
C028	1-161-055-00	CERAMIC	0.022MF	10%	25V
C029	1-130-478-00	MYLAR	0.0039MF	5%	50V
C030	1-130-478-00	MYLAR	0.0039MF	5%	50V
C031	1-130-478-00	MYLAR	0.0039MF	5%	50V
C032	1-123-380-00	ELECT	1MF	20%	50V
C033	1-123-330-00	ELECT	22MF	20%	16V
C034	1-123-380-00	ELECT	1MF	20%	50V
C035	1-102-963-00	CERAMIC	33PF	5%	50V
C036	1-123-332-00	ELECT	47MF	20%	16V
C037	1-123-356-00	ELECT	10MF	20%	16V
C038	1-123-356-00	ELECT	10MF	20%	16V
C039	1-161-059-00	CERAMIC	0.047MF	10%	25V
C040	1-130-024-00	FILM	0.0033MF	5%	50V
C041	1-130-014-00	FILM	470PF	5%	50V
C042	1-161-059-00	CERAMIC	0.047MF	10%	25V
C043	1-161-055-00	CERAMIC	0.022MF	10%	25V
C044	1-136-244-11	FILM	0.1MF	2%	50V
C045	1-136-244-11	FILM	0.1MF	2%	50V
C046	1-123-308-00	ELECT	220MF	20%	10V
C047	1-136-243-11	FILM	0.047MF	2%	50V
C048	1-136-243-11	FILM	0.047MF	2%	50V
C049	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C050	1-102-504-00	CERAMIC	4PF	0.25PF	50V
C051	1-102-978-00	CERAMIC	220PF	5%	50V
C052	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C054	1-102-529-00	CERAMIC	100PF	5%	50V
C101	1-102-963-00	CERAMIC	33PF	5%	50V
C102	1-102-963-00	CERAMIC	33PF	5%	50V
C103	1-123-381-00	ELECT	2.2MF	20%	50V
C104	1-161-059-00	CERAMIC	0.047MF	10%	25V
C105	1-102-973-00	CERAMIC	100PF	5%	50V
C106	1-130-495-00	MYLAR	0.1MF	5%	50V
C107	1-130-493-00	MYLAR	0.068MF	5%	50V
C108	1-130-493-00	MYLAR	0.068MF	5%	50V
C109	1-102-963-00	CERAMIC	33PF	5%	50V
C110	1-123-356-00	ELECT	10MF	20%	16V
C111	1-101-004-00	CERAMIC	0.01MF		50V
C112	1-123-356-00	ELECT	10MF	20%	16V
C201	1-123-333-00	ELECT	100MF	20%	16V
C202	1-123-333-00	ELECT	100MF	20%	16V
C203	1-123-332-00	ELECT	47MF	20%	16V
C204	1-101-004-00	CERAMIC	0.01MF		50V
C206	1-123-380-00	ELECT	1MF	20%	50V
C207	1-123-356-00	ELECT	10MF	20%	50V
C208	1-101-004-00	CERAMIC	0.01MF		50V
C209	1-101-004-00	CERAMIC	0.01MF		50V
C311	1-161-057-00	CERAMIC	0.033MF	10%	25V
C312	1-161-047-00	CERAMIC	0.0047MF	20%	25V
C313	1-102-116-00	CERAMIC	680PF	10%	50V
C315	1-123-356-00	ELECT	10MF	20%	16V
C316	1-161-025-00	CERAMIC	0.1MF	10%	25V
C501	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C503	1-102-525-00	CERAMIC	68PF	5%	50V
C505	1-123-333-00	ELECT	100MF	20%	16V
C506	1-123-333-00	ELECT	100MF	20%	16V
C507	1-102-125-00	CERAMIC	0.0047MF	10%	50V

FILTER

Ref.No	Part No.	Description	Remark
CF001	1-527-840-00	FILTER, CERAMIC	
CF002	1-527-839-00	FILTER, CERAMIC	
CF003	1-404-134-00	TRAP, CERAMIC (5.5MHZ)	

CONNECTOR

Ref.No	Part No.	Description	Remark
CN001	*1-560-892-00	PIN, CONNECTOR 4P	
CN002	*1-560-894-00	PIN, CONNECTOR 6P	
CN003	*1-560-892-00	PIN, CONNECTOR 4P	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

TU-73

Ref.No	Part No.	Description	Remark
CN101	*1-560-899-00	PIN, CONNECTOR 11P	
CN201	*1-560-893-00	PIN, CONNECTOR 5P	

DIODE

Ref.No	Part No.	Description	Remark
D101	8-719-812-33	DIODE TLG123A	
D102	8-719-812-31	DIODE TLR123	
D103	8-719-812-31	DIODE TLR123	
D104	8-719-911-19	DIODE 1SS119	
D201	8-719-911-19	DIODE 1SS119	
D301	8-719-911-19	DIODE 1SS119	
D303	8-719-000-12	DIODE MC931	
D305	8-719-911-19	DIODE 1SS119	
D306	8-719-911-19	DIODE 1SS119	

IC

Ref.No	Part No.	Description	Remark
IC001	8-759-276-07	IC TA7607AP	
IC002	8-759-909-54	IC TDA2546A	
IC003	8-759-913-15	IC TDA3800GS	
IC004	8-759-145-58	IC UPC4558C	
IC101	8-759-602-62	IC M50160-111SP	
IC102	8-759-600-66	IC M58653P	
IC103	8-759-800-12	IC LA7920	
IC201	8-759-157-40	IC UPC574J	

COIL

Ref.No	Part No.	Description	Remark
L001	1-408-592-41	MICRO INDUCTOR 1.2UH	
L002	1-408-591-00	MICRO INDUCTOR 1UH	
L003	1-408-600-00	MICRO INDUCTOR 5.6UH	
L004	1-408-602-00	MICRO INDUCTOR 8.2UH	
L005	1-408-600-00	MICRO INDUCTOR 5.6UH	
L006	1-408-600-00	MICRO INDUCTOR 5.6UH	
L007	1-408-591-00	MICRO INDUCTOR 1UH	
L008	1-408-403-00	MICRO INDUCTOR 3.3UH	
L501	1-408-615-41	MICRO INDUCTOR 100UH	
L502	1-408-615-41	MICRO INDUCTOR 100UH	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q001	8-729-203-28	TRANSISTOR 2SC2216	
Q002	8-729-245-83	TRANSISTOR 2SC2458	
Q101	8-729-245-83	TRANSISTOR 2SC2458	
Q102	8-729-245-83	TRANSISTOR 2SC2458	
Q103	8-729-900-89	TRANSISTOR DTC144ES	
Q201	8-729-900-89	TRANSISTOR DTC144ES	
Q202	8-729-103-43	TRANSISTOR 2SB734	
Q204	8-729-900-74	TRANSISTOR DTC143TS	
Q205	8-729-900-74	TRANSISTOR DTC143TS	
Q305	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q306	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q310	8-729-900-89	TRANSISTOR DTC144ES	

RESISTOR

Ref.No	Part No.	Description				Remark
R001	1-247-819-00	CARBON	330	5%	1/6W	
R002	1-247-847-00	CARBON	4.7K	5%	1/6W	
R003	1-249-421-11	CARBON	2.2K	5%	1/6W	
R004	1-247-815-00	CARBON	220	5%	1/6W	
R005	1-247-813-00	CARBON	180	5%	1/6W	
R007	1-247-835-00	CARBON	1.5K	5%	1/6W	
R008	1-247-827-00	CARBON	680	5%	1/6W	
R009	1-247-825-00	CARBON	560	5%	1/6W	
R010	1-247-877-00	CARBON	82K	5%	1/6W	
R011	1-247-867-00	CARBON	33K	5%	1/6W	
R012	1-247-879-00	CARBON	100K	5%	1/6W	
R013	1-247-879-00	CARBON	100K	5%	1/6W	
R014	1-247-831-00	CARBON	1K	5%	1/6W	
R015	1-247-813-00	CARBON	180	5%	1/6W	
R016	1-247-807-00	CARBON	100	5%	1/6W	
R020	1-247-829-00	CARBON	820	5%	1/6W	
R021	1-247-829-00	CARBON	820	5%	1/6W	
R022	1-247-829-00	CARBON	820	5%	1/6W	
R023	1-247-847-00	CARBON	4.7K	5%	1/6W	
R024	1-247-853-00	CARBON	8.2K	5%	1/6W	
R025	1-247-863-00	CARBON	22K	5%	1/6W	
R026	1-247-863-00	CARBON	22K	5%	1/6W	
R027	1-247-853-00	CARBON	8.2K	5%	1/6W	
R029	1-247-901-00	CARBON	820K	5%	1/6W	
R030	1-247-861-00	CARBON	18K	5%	1/6W	
R031	1-247-865-00	CARBON	27K	5%	1/6W	
R032	1-247-829-00	CARBON	820	5%	1/6W	
R033	1-215-461-00	METAL	47K	1%	1/6W	
R034	1-215-409-91	METAL	330	1%	1/6W	
R035	1-215-487-00	METAL	560K	1%	1/6W	
R036	1-247-831-00	CARBON	1K	5%	1/6W	
R037	1-215-460-00	METAL	43K	1%	1/6W	
R038	1-215-408-00	METAL	300	1%	1/6W	
R039	1-215-486-00	METAL	510K	1%	1/6W	
R040	1-247-831-00	CARBON	1K	5%	1/6W	
R041	1-247-847-00	CARBON	4.7K	5%	1/6W	
R104	1-247-863-00	CARBON	22K	5%	1/6W	
R105	1-247-863-00	CARBON	22K	5%	1/6W	
R106	1-247-863-00	CARBON	22K	5%	1/6W	
R110	1-247-863-00	CARBON	22K	5%	1/6W	
R111	1-247-853-00	CARBON	8.2K	5%	1/6W	
R112	1-247-833-00	CARBON	1.2K	5%	1/6W	
R113	1-247-833-00	CARBON	1.2K	5%	1/6W	
R115	1-249-421-11	CARBON	2.2K	5%	1/6W	
R116	1-247-863-00	CARBON	22K	5%	1/6W	
R117	1-247-863-00	CARBON	22K	5%	1/6W	
R118	1-247-891-00	CARBON	330K	5%	1/6W	
R119	1-249-421-11	CARBON	2.2K	5%	1/6W	
R201	1-247-867-00	CARBON	33K	5%	1/6W	
R202	1-247-863-00	CARBON	22K	5%	1/6W	
R203	1-247-847-00	CARBON	4.7K	5%	1/6W	
R204	1-247-831-00	CARBON	1K	5%	1/6W	
R205	1-247-871-00	CARBON	47K	5%	1/6W	
R206	1-247-843-00	CARBON	3.3K	5%	1/6W	
R207	1-247-851-00	CARBON	6.8K	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
R208	1-206-670-00	METAL OXIDE 1.8K 5% 2W	F
R211	1-247-891-00	CARBON 330K 5% 1/6W	
R310	1-247-831-00	CARBON 1K 5% 1/6W	
R312	1-247-903-00	CARBON 1M 5% 1/6W	
R313	1-247-855-00	CARBON 10K 5% 1/6W	
R314	1-247-855-00	CARBON 10K 5% 1/6W	
R315	1-247-855-00	CARBON 10K 5% 1/6W	
R316	1-247-855-00	CARBON 10K 5% 1/6W	
R320	1-247-855-00	CARBON 10K 5% 1/6W	
R321	1-247-847-00	CARBON 4.7K 5% 1/6W	
R501	1-247-837-00	CARBON 1.8K 5% 1/6W	

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
RV001	1-228-993-00	RES, ADJ, CARBON 4.7K	
RV002	1-228-995-00	RES, ADJ, CARBON 22K	

SWITCH

Ref.No	Part No.	Description	Remark
S101	1-553-997-00	SWITCH, KEY BOARD	
S102	1-553-997-00	SWITCH, KEY BOARD	
S103	1-553-997-00	SWITCH, KEY BOARD	
S104	1-553-997-00	SWITCH, KEY BOARD	
S105	1-553-997-00	SWITCH, KEY BOARD	
S106	1-553-997-00	SWITCH, KEY BOARD	
S107	1-553-997-00	SWITCH, KEY BOARD	

FILTER

Ref.No	Part No.	Description	Remark
SWF001	1-404-438-00	FILTER, SAW	

TRANSFORMER

Ref.No	Part No.	Description	Remark
T001	1-404-068-00	COIL, VIF	
T002	1-404-068-00	COIL, VIF	
T004	1-404-427-00	VIFT	
T005	1-404-427-00	VIFT	
T006	1-404-465-00	COIL, VIF (MOLD TYPE)	
T007	1-404-477-00	COIL, IF	
T008	1-404-619-11	COIL, IF	
T009	1-404-477-00	COIL, IF	

PIN LEAD

Ref.No	Part No.	Description	Remark
TP001	*3-846-049-11	PIN, LEAD	

CRYSTAL

Ref.No	Part No.	Description	Remark
X101	1-527-822-00	OSCILLATOR, CERAMIC	

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*1-613-233-11 RD-21 BOARD

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DIODE

Ref.No	Part No.	Description	Remark
PC101	8-719-913-41	DIODE SPI201-22	

RESISTOR

Ref.No	Part No.	Description	Remark
R101	1-247-815-00	CARBON 220 5% 1/6W	
R102	1-247-867-00	CARBON 33K 5% 1/6W	
R103	1-247-859-00	CARBON 15K 5% 1/6W	

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*1-613-232-11 RD-20 BOARD

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DIODE

Ref.No	Part No.	Description	Remark
PC001	8-719-913-41	DIODE SPI201-22	

RESISTOR

Ref.No	Part No.	Description	Remark
R001	1-247-815-00	CARBON 220 5% 1/6W	
R002	1-247-867-00	CARBON 33K 5% 1/6W	
R003	1-247-859-00	CARBON 15K 5% 1/6W	

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*A-6725-485-A TM-79 BOARD, COMPLETE

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Ref.No	Part No.	Description	Remark
	1-519-351-11	INDICATOR TUBE, FLUORESCENT	
	1-519-352-11	INDICATOR TUBE, FLUORESCENT	
	*3-684-005-01	HOLDER (S), LED	
	*3-696-148-01	HOLDER, INDICATION TUBE	

CAPACITOR

Ref.No	Part No.	Description	Remark
C301	1-102-824-00	CERAMIC 470PF 5% 50V	
C302	1-102-904-91	CERAMIC 110PF 5% 50V	
C307	1-123-622-00	ELECT 22MF 20% 16V	
C308	1-161-059-00	CERAMIC 0.047MF 10% 50V	

CONNECTOR

Ref.No	Part No.	Description	Remark
CN301	*1-564-005-00	PIN, CONNECTOR 6P	

COMPOSITION CIRCUIT BLOCK

Ref.No	Part No.	Description	Remark
CP001	1-232-910-11	COMPOSITION CIRCUIT BLOCK	
CP002	1-232-911-11	COMPOSITION CIRCUIT BLOCK	

DIODE

Ref.No	Part No.	Description	Remark
D301	8-719-100-43	DIODE RD7.5EB1	
D501	8-719-812-31	DIODE TLR123	
D502	8-719-812-31	DIODE TLR123	
D503	8-719-812-33	DIODE TLG123A	

IC

Ref.No	Part No.	Description	Remark
IC301	8-759-101-99	IC UPD552C-105	
IC302	8-759-729-03	IC NJM2903D	
IC303	8-759-240-50	IC TC4050BP	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q301	8-729-204-83	TRANSISTOR 2SA1048-GR	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
Q302	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q303	8-729-245-83	TRANSISTOR 2SC2458	
Q305	8-729-245-83	TRANSISTOR 2SC2458	
Q306	8-729-204-83	TRANSISTOR 2SA1048-GR	

RESISTOR

Ref.No	Part No.	Description			
R301	1-247-867-00	CARBON	33K	5%	1/6W
R302	1-247-867-00	CARBON	33K	5%	1/6W
R303	1-247-867-00	CARBON	33K	5%	1/6W
R304	1-247-855-00	CARBON	10K	5%	1/6W
R305	1-247-896-00	CARBON	510K	5%	1/6W
R306	1-247-867-00	CARBON	33K	5%	1/6W
R307	1-247-867-00	CARBON	33K	5%	1/6W
R308	1-215-436-00	METAL	4.3K	1%	1/6W
R309	1-215-445-00	METAL	10K	1%	1/6W
R311	1-247-879-00	CARBON	100K	5%	1/6W
R313	1-247-879-00	CARBON	100K	5%	1/6W
R314	1-215 445-00	METAL	10K	1%	1/6W
R315	1-215-445-00	METAL	10K	1%	1/6W
R316	1-215-445-00	METAL	10K	1%	1/6W
R317	1-215-452-00	METAL	20K	1%	1/6W
R318	1-215-452-00	METAL	20K	1%	1/6W
R319	1-215-452-00	METAL	20K	1%	1/6W
R320	1-215-452-00	METAL	20K	1%	1/6W
R321	1-215-452-00	METAL	20K	1%	1/6W
R332	1-247-883-00	CARBON	150K	5%	1/6W
R333	1-247-883-00	CARBON	150K	5%	1/6W
R334	1-247-883-00	CARBON	150K	5%	1/6W
R335	1-247-883-00	CARBON	150K	5%	1/6W
R336	1-247-883-00	CARBON	150K	5%	1/6W
R337	1-247-883-00	CARBON	150K	5%	1/6W
R338	1-247-883-00	CARBON	150K	5%	1/6W
R339	1-247-883-00	CARBON	150K	5%	1/6W
R340	1-247-883-00	CARBON	150K	5%	1/6W
R341	1-247-883-00	CARBON	150K	5%	1/6W
R342	1-247-883-00	CARBON	150K	5%	1/6W
R347	1-247-771-00	CARBON	3.3	5%	1/6W
R348	1-247-879-00	CARBON	100K	5%	1/6W
R349	1-247-879-00	CARBON	100K	5%	1/6W
R350	1-247-879-00	CARBON	100K	5%	1/6W
R351	1-247-879-00	CARBON	100K	5%	1/6W
R352	1-247-855-00	CARBON	10K	5%	1/6W
R353	1-247-871-00	CARBON	47K	5%	1/6W
R354	1-247-871-00	CARBON	47K	5%	1/6W
R501	1-247-805-00	CARBON	82	5%	1/6W
R502	1-247-805-00	CARBON	82	5%	1/6W
R503	1-247-829-00	CARBON	820	5%	1/6W
R504	1-247-879-00	CARBON	100K	5%	1/6W
R505	1-247-843-00	CARBON	3.3K	5%	1/6W
R506	1-247-843-00	CARBON	3.3K	5%	1/6W

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
RV501	1-226-709-00	RES, ADJ, SOLID 4.7K	
RV502	1-226-709-00	RES, ADJ, SOLID 4.7K	

SWITCH

Ref.No	Part No.	Description	Remark
S001	0-366-843-00	SWITCH, KEY BOARD	
S002	0-366-843-00	SWITCH, KEY BOARD	
S003	0-366-843-00	SWITCH, KEY BOARD	
S004	0-366-843-00	SWITCH, KEY BOARD	
S005	0-366-843-00	SWITCH, KEY BOARD	
S006	0-366-843-00	SWITCH, KEY BOARD	
S501	1-554-419-00	SWITCH, PUSH (1 KEY)	
S502	1-554-174-00	SWITCH, KEY BOARD	
S503	1-554-174-00	SWITCH, KEY BOARD	
S504	1-554-174-00	SWITCH, KEY BOARD	
S505	1-554-174-00	SWITCH, KEY BOARD	
S506	1-554-174-00	SWITCH, KEY BOARD	
S507	1-554-174-00	SWITCH, KEY BOARD	

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
VR501	1-230-857-11	RES, VAR, SLIDE 20K/20K	

CRYSTAL

Ref.No	Part No.	Description	Remark
X301	1-527-532-31	OSCILLATOR, CERAMIC	

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*1-616-795-11 RS-12 BOARD

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Ref.No	Part No.	Description	Remark
	*3-696-114-02	SPACER, LED, BETA-HIFI	
	*4-333-624-00	FILM (N), SPECIAL	

CAPACITOR

Ref.No	Part No.	Description			
C001	1-123-617-00	ELECT	10MF	20%	16V
C002	1-106-184-00	MYLAR	0.0033MF	5%	50V
C003	1-123-617-00	ELECT	10MF	20%	16V
C004	1-123-617-00	ELECT	10MF	20%	16V
C005	1-161-057-00	CERAMIC	0.033MF	10%	25V
C006	1-123-821-00	ELECT	47MF	20%	16V
C007	1-161-047-00	CERAMIC	0.0047MF	10%	25V

DIODE

Ref.No	Part No.	Description	Remark
D001	8-719-110-32	DIODE PH302B	
D002	8-719-815-55	DIODE 1S1555	
D003	8-719-915-49	DIODE SLF206B	

IC

Ref.No	Part No.	Description	Remark
IC001	8-759-102-84	IC UPC1373HA	

COIL

Ref.No	Part No.	Description	Remark
L001	1-404-310-00	COIL 4.7MMH	

When indicating parts by reference number, please include the board name.

RS-12 TM-80

Ref.No	Part No.	Description	Remark
		RESISTOR	
R001	1-247-831-00	CARBON 1K 5% 1/6W	
R002	1-247-791-00	CARBON 22 5% 1/6W	
R003	1-247-887-00	CARBON 220K 5% 1/6W	
R004	1-247-823-00	CARBON 470 5% 1/6W	

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*A-6725-487-A TM-80 BOARD, COMPLETE
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		CAPACITOR	
C001	1-123-382-00	ELECT 3.3MF 20% 50V	
C002	1-161-055-00	CERAMIC 0.022MF 10% 25V	
C003	1-123-298-00	ELECT 470MF 20% 6.3V	
C005	1-102-525-00	CERAMIC 68PF 5% 50V	
C006	1-102-852-00	CERAMIC 47PF 5% 50V	
C008	1-123-357-00	ELECT 22MF 20% 50V	
C009	1-161-055-00	CERAMIC 0.022MF 10% 25V	
C010	1-161-055-00	CERAMIC 0.022MF 10% 25V	
C011	1-161-773-91	CERAMIC 0.1MF 20% 25V	
C012	1-123-369-00	ELECT 4.7MF 20% 50V	
C013	1-123-380-00	ELECT 1MF 20% 50V	
C014	1-123-356-00	ELECT 10MF 20% 16V	
C015	1-123-308-00	ELECT 220MF 20% 10V	
C016	1-161-013-00	CERAMIC 0.01MF 10% 25V	
C303	1-123-369-00	ELECT 4.7MF 20% 25V	
C304	1-123-369-00	ELECT 4.7MF 20% 25V	
C305	1-123-381-00	ELECT 2.2MF 20% 50V	
C306	1-123-381-00	ELECT 2.2MF 20% 50V	
		CONNECTOR	
CN002	*1-560-897-00	PIN, CONNECTOR 9P	
CN302	*1-564-005-00	PIN, CONNECTOR 6P	
		TRIMMER	
CT001	1-141-022-21	CAP, TRIMMER, CERAMIC	
		DIODE	
D001	8-719-812-41	DIODE TLR124	
D002	8-719-200-02	DIODE 10E-2	
D003	8-719-200-02	DIODE 10E-2	
D004	8-719-911-19	DIODE 1SS119	
D005	8-719-182-07	DIODE RD8.2E-B	
D006	8-719-911-19	DIODE 1SS119	
D007	8-719-911-19	DIODE 1SS119	
		IC	
IC001	8-759-911-09	IC MB88525B-112M	
IC002	8-759-913-41	IC S-8054ALB	
IC304	8-759-961-38	IC BA6138	

Ref.No	Part No.	Description	Remark
		TRANSISTOR	
Q001	8-729-245-83	TRANSISTOR 2SC2458	
Q002	8-729-245-83	TRANSISTOR 2SC2458	
Q003	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q004	8-729-900-89	TRANSISTOR DTC144ES	
Q005	8-729-245-83	TRANSISTOR 2SC2458	
Q006	8-729-245-83	TRANSISTOR 2SC2458	
Q007	8-729-245-83	TRANSISTOR 2SC2458	
		RESISTOR	
R001	1-247-867-00	CARBON 33K 5% 1/6W	
R002	1-247-874-00	CARBON 62K 5% 1/6W	
R003	1-247-872-00	CARBON 51K 5% 1/6W	
R004	1-247-873-00	CARBON 56K 5% 1/6W	
R005	1-247-869-00	CARBON 39K 5% 1/6W	
R006	1-247-885-00	CARBON 180K 5% 1/6W	
R007	1-247-879-00	CARBON 100K 5% 1/6W	
R008	1-247-867-00	CARBON 33K 5% 1/6W	
R009	1-247-879-00	CARBON 100K 5% 1/6W	
R010	1-247-871-00	CARBON 47K 5% 1/6W	
R026	1-247-883-00	CARBON 150K 5% 1/6W	
R027	1-247-883-00	CARBON 150K 5% 1/6W	
R028	1-247-883-00	CARBON 150K 5% 1/6W	
R029	1-247-883-00	CARBON 150K 5% 1/6W	
R030	1-247-883-00	CARBON 150K 5% 1/6W	
R031	1-247-883-00	CARBON 150K 5% 1/6W	
R032	1-247-883-00	CARBON 150K 5% 1/6W	
R033	1-247-883-00	CARBON 150K 5% 1/6W	
R034	1-247-883-00	CARBON 150K 5% 1/6W	
R035	1-247-883-00	CARBON 150K 5% 1/6W	
R036	1-247-883-00	CARBON 150K 5% 1/6W	
R037	1-247-883-00	CARBON 150K 5% 1/6W	
R038	1-247-883-00	CARBON 150K 5% 1/6W	
R039	1-247-883-00	CARBON 150K 5% 1/6W	
R040	1-247-883-00	CARBON 150K 5% 1/6W	
R041	1-247-883-00	CARBON 150K 5% 1/6W	
R042	1-247-883-00	CARBON 150K 5% 1/6W	
R043	1-247-883-00	CARBON 150K 5% 1/6W	
R044	1-247-883-00	CARBON 150K 5% 1/6W	
R046	1-247-879-00	CARBON 100K 5% 1/6W	
R047	1-247-847-00	CARBON 4.7K 5% 1/6W	
R048	1-247-863-00	CARBON 22K 5% 1/6W	
R049	1-247-843-00	CARBON 3.3K 5% 1/6W	
R050	1-247-807-00	CARBON 100 5% 1/6W	
R051	1-247-855-00	CARBON 10K 5% 1/6W	
R052	1-247-855-00	CARBON 10K 5% 1/6W	
R053	1-247-855-00	CARBON 10K 5% 1/6W	
R054	1-247-855-00	CARBON 10K 5% 1/6W	
R310	1-247-891-00	CARBON 330K 5% 1/6W	
R326	1-247-837-00	CARBON 1.8K 5% 1/6W	
R327	1-247-837-00	CARBON 1.8K 5% 1/6W	
R328	1-247-891-00	CARBON 330K 5% 1/6W	

When indicating parts by reference number, please include the board name.

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
RV001	1-228-995-00	RES, ADJ, CARBON 22K	
RV301	1-228-994-00	RES, ADJ, CARBON 10K	
RV302	1-228-994-00	RES, ADJ, CARBON 10K	

THERMISTOR

THP001	1-806-892-11	THERMISTOR (POSITIVE)

CRYSTAL

X001	1-567-098-00	VIBRATOR, CRYSTAL

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*1-616-794-11 HP-14 BOARD

CAPACITOR

C004	1-123-822-00	ELECT	47MF	20%	10V
C008	1-161-043-00	CERAMIC	0.0022MF	10%	25V

DIODE

D003	8-719-100-40	DIODE RD6.8EB1

JACK

J001	1-507-796-21	JACK

COIL

L001	1-408-600-00	MICRO INDUCTOR 5.6UH

RESISTOR

R011	1-247-799-00	CARBON	47	5%	1/6W
R012	1-247-855-00	CARBON	10K	5%	1/6W

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1-605-071-00 LM-8 BOARD

CAPACITOR

C101	1-161-057-00	CERAMIC	0.033MF	10%	50V
C102	1-161-057-00	CERAMIC	0.033MF	10%	50V

COIL

L101	1-408-120-00	MICRO INDUCTOR 18UH
L102	1-408-120-00	MICRO INDUCTOR 18UH

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Ref.No	Part No.	Description	Remark
	*A-6729-228-A	PS-70 BOARD, COMPLETE (EC MODEL)	

	*A-6729-231-A	PS-70 BOARD, COMPLETE (AS MODEL)	

	1-533-162-00	HOLDER, FUSE
	⚠*2-430-344-01	COVER (CC-1017), INSULATING (EC MODEL)

CAPACITOR

C001	1-123-332-00	ELECT	47MF	20%	25V
C002	1-123-381-00	ELECT	2.2MF	20%	50V
C005	1-123-333-00	ELECT	100MF	20%	16V
C006	1-123-332-00	ELECT	47MF	20%	16V
C007	1-123-333-00	ELECT	100MF	20%	16V
C008	1-123-332-00	ELECT	47MF	20%	16V
C009	1-123-332-00	ELECT	47MF	20%	16V
C010	1-123-318-00	ELECT	33MF	20%	10V
C011	1-123-372-00	ELECT	33MF	20%	63V
C012	1-123-375-00	ELECT	220MF	20%	63V
C013	1-123-375-00	ELECT	220MF	20%	63V
C014	1-123-336-00	ELECT	470MF	20%	25V
C015	1-123-338-00	ELECT	2200MF	20%	25V
C016	⚠ 1-130-710-00	FILM	0.1MF	20%	250V
C021	1-101-006-00	CERAMIC	0.047MF		50V
C022	1-101-006-00	CERAMIC	0.047MF		50V
C023	1-101-006-00	CERAMIC	0.047MF		50V
C024	⚠ 1-161-742-00	CERAMIC	0.0022MF	20%	400V(EC MODEL)
C025	⚠ 1-161-742-00	CERAMIC	0.0022MF	20%	400V(EC MODEL)
C026	⚠ 1-161-742-00	CERAMIC	0.0022MF	20%	400V(EC MODEL)
C027	⚠ 1-161-742-00	CERAMIC	0.0022MF	20%	400V(EC MODEL)
C029	1-123-306-00	ELECT	47MF	20%	10V
C030	1-123-356-00	ELECT	10MF	20%	16V

CONNECTOR

CN001	*1-560-891-00	PIN, CONNECTOR 3P
CN002	*1-560-893-00	PIN, CONNECTOR 5P
CN003	*1-560-897-00	PIN, CONNECTOR 9P
CN004	*1-560-890-00	PIN, CONNECTOR 2P
CN005	*1-560-892-00	PIN, CONNECTOR 4P
CN006	*1-560-894-00	PIN, CONNECTOR 6P

DIODE

D001	8-719-200-02	DIODE 10E-2
D002	8-719-200-02	DIODE 10E-2
D003	8-719-200-02	DIODE 10E-2
D004	8-719-200-02	DIODE 10E-2
D010	8-719-200-02	DIODE 10E-2
D011	8-719-100-60	DIODE RD11EB1
D012	8-719-100-97	DIODE RD30EB1

FUSE

F001	⚠1-532-203-11	FUSE, TIME-LAG	T2.0A	250V
F002	⚠1-532-350-11	FUSE, TIME-LAG	T4.0A	250V

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
F003	⚠1-532-259-11	FUSE, TIME-LAG T1.6A				250V

IC LINK

Ref.No	Part No.	Description	Remark
PS002	⚠1-532-727-11	LINK, IC	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q001	8-729-113-32	TRANSISTOR 2SB733-3	
Q003	8-729-178-55	TRANSISTOR 2SC2785-K	
Q004	8-729-382-62	TRANSISTOR 2SC1826-G	
Q005	8-729-900-89	TRANSISTOR DTC144ES	
Q006	8-729-103-43	TRANSISTOR 2SB734-3	
Q007	8-729-900-65	TRANSISTOR DTA144ES	
Q008	8-729-178-55	TRANSISTOR 2SC2785-K	
Q009	8-729-178-55	TRANSISTOR 2SC2785-K	

RESISTOR

Ref.No	Part No.	Description				Remark
R001	1-247-821-00	CARBON	390	5%	1/6W	
R002	1-247-821-00	CARBON	390	5%	1/6W	
R003	1-247-260-00	CARBON	6.8K	5%	1/2W	
R004	1-247-847-00	CARBON	4.7K	5%	1/6W	
R005	1-247-849-00	CARBON	5.6K	5%	1/6W	
R009	1-247-831-00	CARBON	1K	5%	1/6W	
R010	1-247-823-00	CARBON	470	5%	1/6W	
R011	⚠1-217-393-00	FUSIBLE	33	5%	1/4W	F
R012	1-247-855-00	CARBON	10K	5%	1/6W	
R014	⚠1-217-385-00	FUSIBLE	6.8	5%	1/4W	F
R015	1-247-877-00	CARBON	82K	5%	1/6W	
R016	1-247-855-00	CARBON	10K	5%	1/6W	
R017	1-247-871-00	CARBON	47K	5%	1/6W	
R018	1-244-877-51	CARBON	1.5K	5%	1/2W	

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*1-616-741-11 PS-71 BOARD

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Ref.No	Part No.	Description	Remark
	1-533-162-00	HOLDER, FUSE	

CAPACITOR

Ref.No	Part No.	Description				Remark
C003	1-125-298-00	ELECT(BLOCK)	10000MF	20%	25V	
C004	1-161-024-00	CERAMIC	0.082MF	10%	25V	

DIODE

Ref.No	Part No.	Description	Remark
D005	8-719-907-48	DIODE ERC01-02FL15	
D006	8-719-907-48	DIODE ERC01-02FL15	
D007	8-719-907-48	DIODE ERC01-02FL15	
D008	8-719-907-48	DIODE ERC01-02FL15	
D009	8-719-100-97	DIODE RD30EB1	

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*1-616-742-11 PS-78 BOARD

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DIODE

Ref.No	Part No.	Description	Remark
D013	⚠8-719-168-07	DIODE RD6.8E-B	

IC

Ref.No	Part No.	Description	Remark
IC001	8-749-954-43	IC STK5443	

IC LINK

Ref.No	Part No.	Description	Remark
PS001	⚠1-532-637-00	LINK, IC	

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MISCELLANEOUS

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Ref.No	Part No.	Description	Remark
	A-6761-103-A	ACE ASSY	
	⚠.1-464-479-11	BOOSTER MIXER, RF MODULATOR (RFU-827) (EC MODEL)	
	⚠.1-464-551-11	BOOSTER MIXER, RF MODULATOR (RFU-841) (AS MODEL)	
	⚠.1-551-732-11	CORD, POWER (AS MODEL)	
	⚠.1-551-908-41	CORD, POWER (EC MODEL)	
	8-825-508-10	HEAD, FE (FULL ERACE HEAD)	
L901	1-464-503-21	SENSOR, S COIL (SUPPLY SENSOR) (L901)	
L902	1-464-491-21	SENSOR, T COIL (TAKE-UP SENSOR) (L902)	
M902	8-838-071-01	MOTOR, DC (BHF-1909C) (CAPSTAN MOTOR)	
M903	*A-4910-049-A	R STATOR(REEL MOTOR)BOARD, COMPLETE(M903	
M904	X-3679-268-1	MOTOR ASSY, L (LOADING/THREADING)	
PM901	⚠1-454-349-61	SOLENOID, PLUNGER (PINCH)	
PM902	⚠1-454-371-31	SOLENOID, PLUNGER (BRAKE)	
S901	1-554-839-11	SWITCH, LEAF (2 GANG) (REC PROOF, CASSETTE DOWN)	
S903	1-554-840-11	SWITCH, LEAF (THREADING END)	
S904	1-554-840-11	SWITCH, LEAF (CASSETTE ON)	
T901	⚠.1-448-187-11	TRANSFORMER, POWER (T901)	

****

ACCESSORIES AND PACKING MATERIALS

****

Part No.	Description	Remark
1-556-893-00	CORD ASSY, COAXIAL	
*3-681-287-01	LID, ACCESSORY CASE	
*3-684-259-01	CASE, ACCESSORY	
3-694-484-01	DRIVER, VOLUME	

****

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

SECTION 7
ADJUSTMENTS

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1. PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT AND REPLACEMENT

1-1. DISASSEMBLY OF CABINET

Refer to SECTION 2 DISASSEMBLY, 2-1 DISASSEMBLY OF CABINET.

1-2. REMOVAL OF THE TU-73 BOARD

Refer to SECTION 2 DISASSEMBLY, 2-2 REMOVAL OF THE TU-73 BOARD.

1-3. REMOVAL OF THE SA-9 BOARD

Refer to SECTION 2 DISASSEMBLY, 2-3 REMOVAL OF THE SA-9 BOARD.

1-4. REMOVAL OF THE RY-4 BOARD

Refer to SECTION 2 DISASSEMBLY, 2-4 REMOVAL OF THE RY-4 BOARD.

1-5. REMOVAL OF THE AF-7 BOARD

Refer to SECTION 2 DISASSEMBLY, 2-5 REMOVAL OF THE AF-7 BOARD.

1-6. REMOVAL OF THE POWER BLOCK

Refer to SECTION 2 DISASSEMBLY, 2-8 REMOVAL OF THE POWER BLOCK.

1-7. OPERATION OF THE UNIT WITH THE FL CASSETTE COMPARTMENT REMOVED

1-7-1. How to Put the Unit into Threading Completed Mode when the FL Cassette Compartment is Removed

1) Connect ordinary screwdriver to short the leaf switch (cassette-on switch).

   Note:
   Be careful that the ordinary screwdriver do not touch any other parts (use tape or other insulation).

2) Press the cassette-down switch and leave it pressed in. When the power button is turned ON threading starts.
   * Refer to SECTION 2 DISASSEMBLY, 2-10 for instructions on how to remove the FL cassette compartment.

[How to EJECT in this condition]

- Press the EJECT button. When unthreading is completed and the internal gear starts to turn, turn the power OFF.

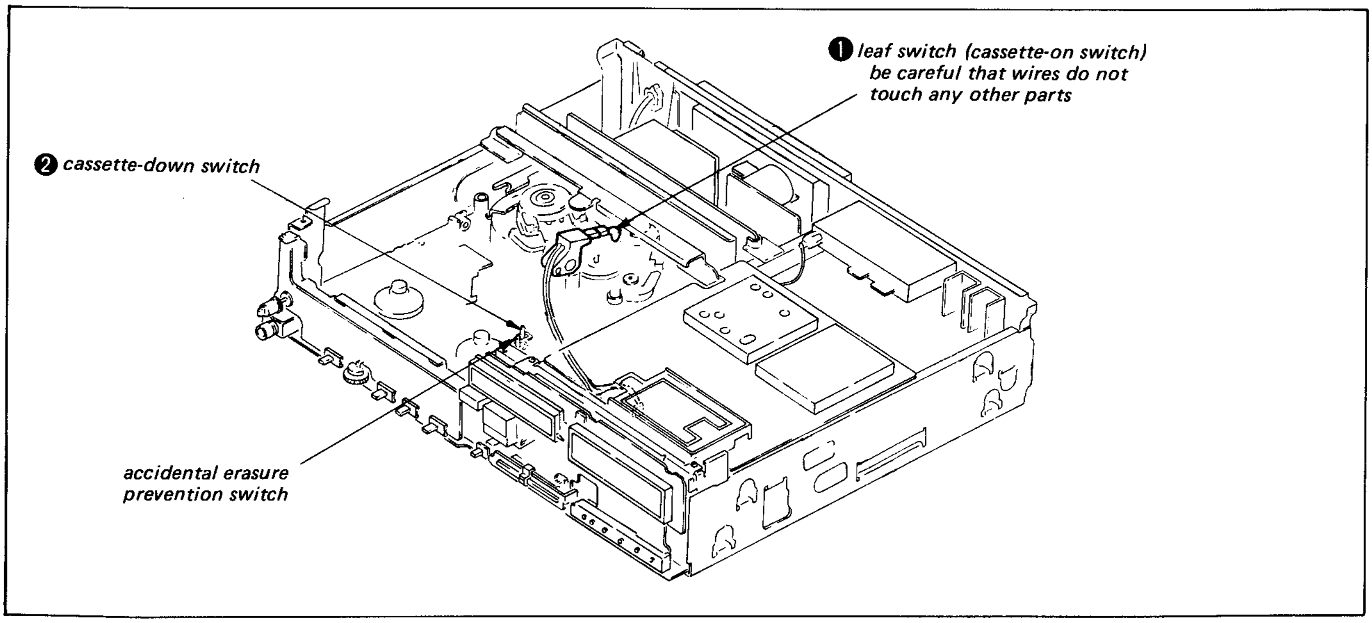

❶ leaf switch (cassette-on switch)
be careful that wires do not touch any other parts
❷ cassette-down switch
accidental erasure prevention switch

Fig. 1-1 How to thread the tape when the FL cassette compartment has been removed

1-7-2. Playback Without Cassette Installed

Complete threading by the procedure described in 1-8-1, then press the playback button.

1-7-3. How to Put in Recording Mode Without Cassette Installed

1) Thread by the procedure in 1-7-1, then ress the accidental erasure prevention switch shown in Fig. 1-2.
2) With the accidental erasure prevention switch pressed down, press the recording button.

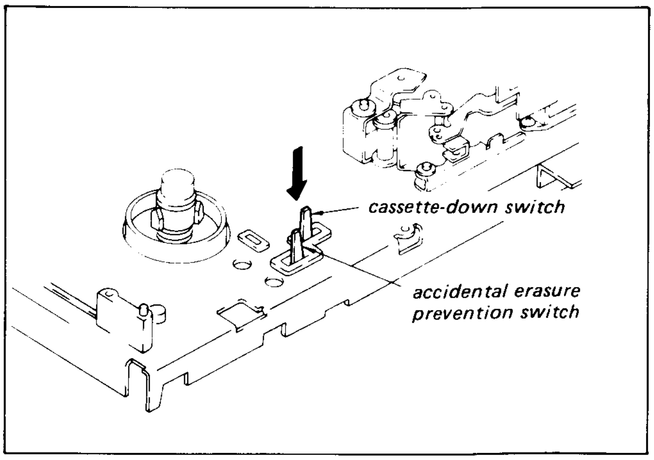

cassette-down switch
accidental erasure prevention switch

Fig. 1-2 How to put the recorder in recording mcde with the FL cassette compartment removed

1-8. HOW TO LOAD, THREAD, UNLOAD AND UNTHREAD WITH THE POWER OFF

1-8-1. Manual Loading and Unloading

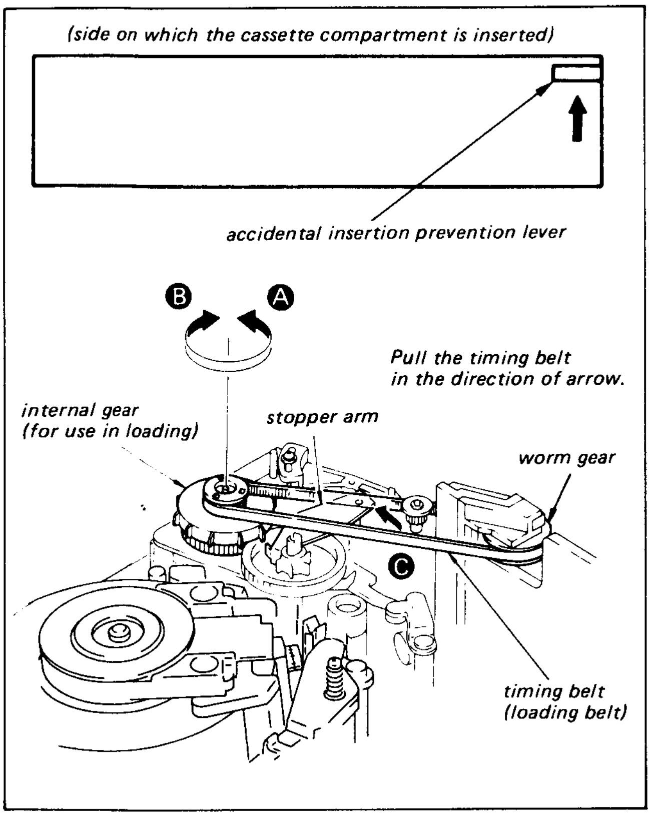

(side on which the cassette compartment is inserted)
accidental insertion prevention lever
Ⓑ
Ⓐ
Pull the timing belt in the direction of arrow.
internal gear (for use in loading)
stopper arm
worm gear
Ⓒ
timing belt (loading belt)

Fig. 1-3 Manual loading and unloading

1) Release the right accidental insertion prevention lever inside the cassette compartment, then press the stopper arm in the direction of arrow Ⓒ and release the internal gear stop.
2) Turn the internal gear manually in the direction of arrow Ⓐ until loading is completed.
3) To unload, turn the internal gear in the direction of arrow Ⓑ.

Note:

When the loading belt has been removed, load and unload by turning the worm gear manually.

1-8-2. Manual Threading and Unthreading

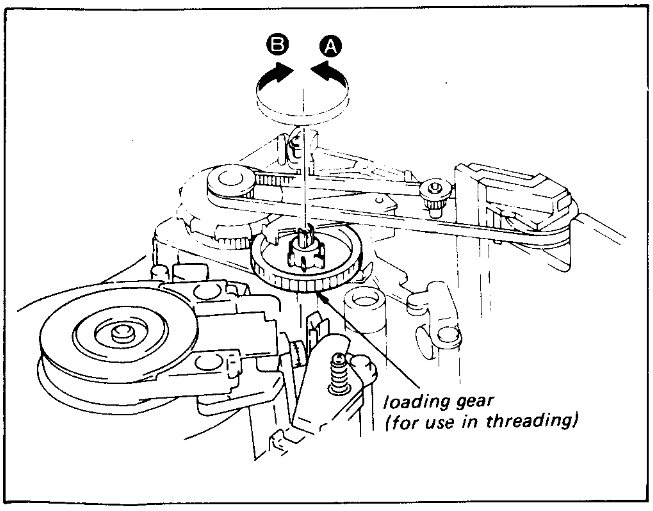

Ⓑ
Ⓐ
loading gear (for use in threading)

Fig. 1-4 Manual threading and unthreading

1) Turn the loading gear in the direction of arrow Ⓐ until loading is completed.
2) To unthread, turn the loading gear in the direction of arrow Ⓑ.

Note:

Always turn the loading gear sideways by hand.

Never use a screwdriver or other tool.

1-9. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref. No.	Name	Part Code	Carved Jig No.	Use and Remarks
J-1	Torque Measurement Tape	J-6080-003-C	SL-0003C	forward torque and back tension measurement
J-2	Parallel Plate	J-6086-750-A	SL-0657	audio/CTL head lateral adjustment capstan shaft vertical adjustment
J-3	Dental Mirror (handle) Dental Mirror (mirror)	J-6080-029-A J-6080-030-1	SL-5052	tape path and tape traveling adjustment check
J-4	Alignment Tape (KR5-2H)	8-969-995-52	———	tracking, overall adjustment of picture quality, etc.
	Alignment Tape (KR5-10C)	8-192-508-01		
J-5	Cleaning Fluid	Y-2031-001-0	———	
J-6	Thickness Gauge	9-911-053-00	———	
J-7	Chamois Cloth	2-034-697-00	———	cleaning
J-8	Head Demagnetizer	widely available	———	demagnetization of video head and audio head
J-9	Cleaning Cassette Tape	8-888-004-00	———	video head cleaning
J-10	Dihedral Adjustment Screw	J-6080-013-A	SL-0013	video dihedral adjustment
J-11	Video Head Checker	7-732-080-01	SL-5151	video head check

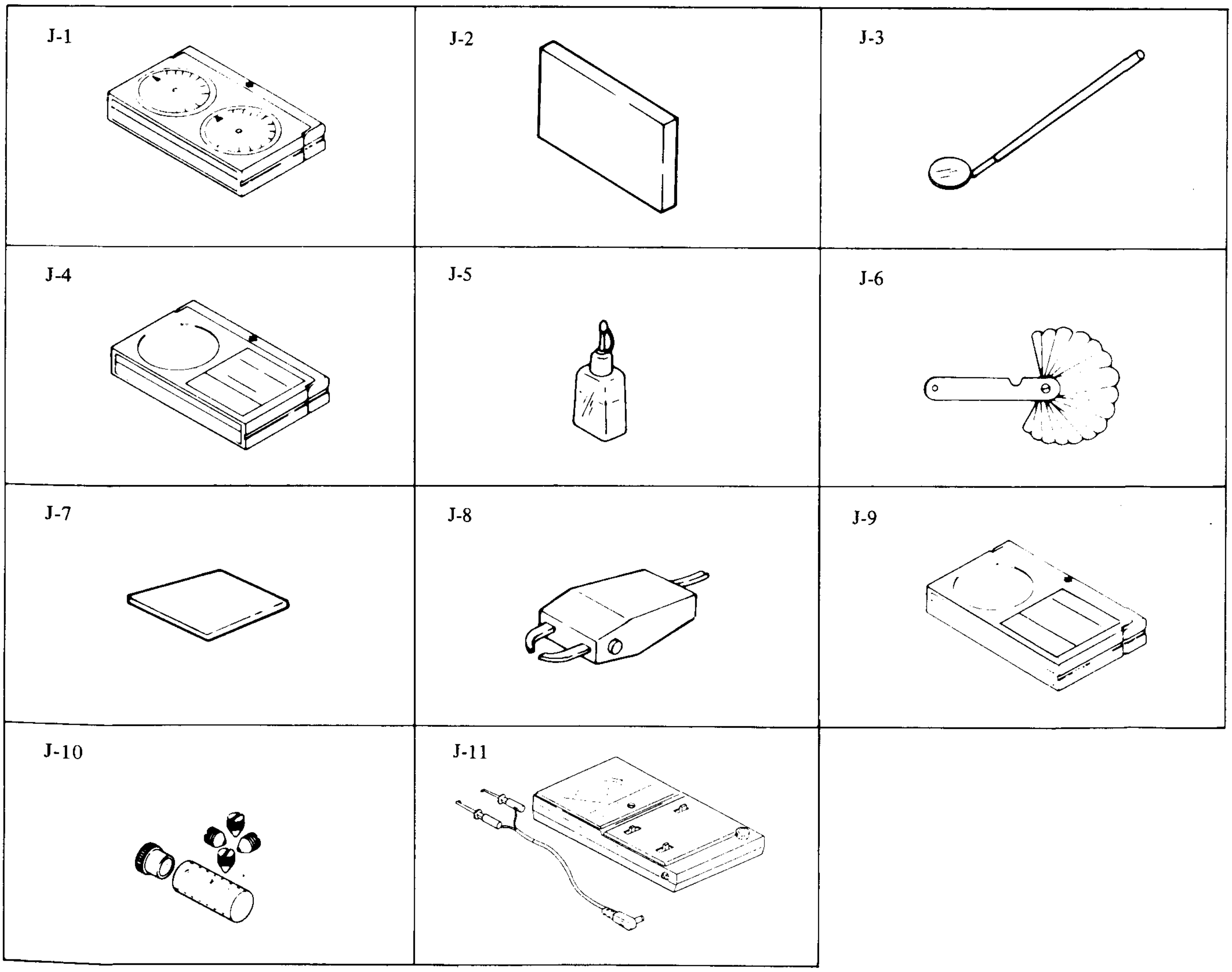


Fig. 1-5 Tools and fixtures required for servicing

2. PERIODIC CHECK AND MAINTENANCE

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

2-1. POST-REPAIR MAINTENANCE

The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1-1. Cleaning of Rotating Head Disk Assembly

1) Press a chamois cloth (Jig Ref. No. J-7) which has been dipped in cleaning fluid (Jig Ref. No. J-5) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a right angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-1-2. Cleaning of the Tape Movement System

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in in cleaning fluid.

2-1-3. Cleaning the Drive System

1) Clean the driving parts with a cloth that has been dipped in cleaning fluid.

parts requiring cleaning

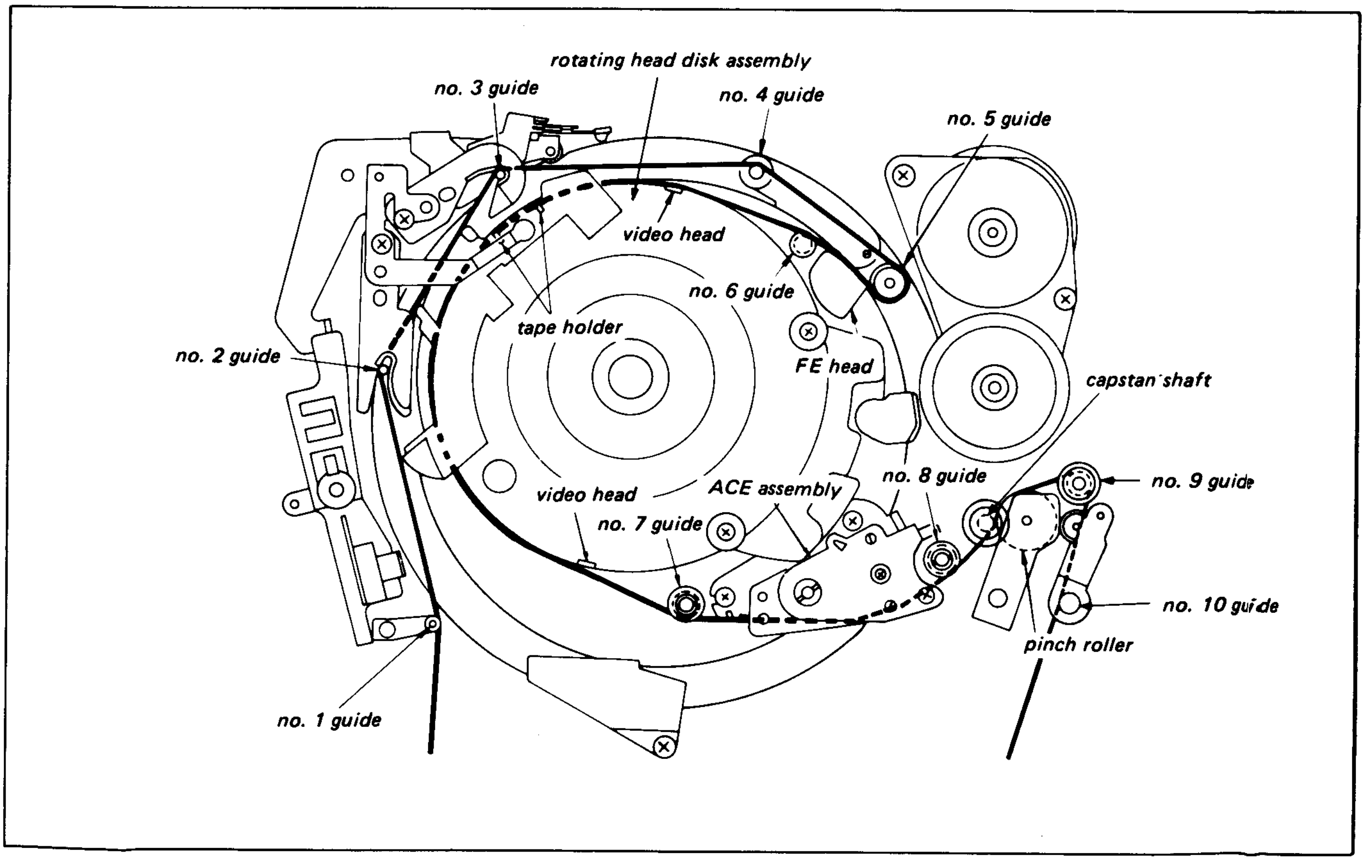

rotating head disk assembly
no. 3 guide
no. 4 guide
no. 5 guide
video head
no. 6 guide
tape holder
no. 2 guide
FE head
capstan shaft
no. 8 guide
no. 9 guide
video head
ACE assembly
no. 7 guide
no. 10 guide
pinch roller
no. 1 guide

Fig. 2-1 Parts requiring cleaning

2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, accoring to user's operating hours.

Maintenance & Check		Replacement Part No.	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Trans-Portation System	Cleaning of tape transportation system	——	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE ass'y	——	○	○	○	○	○	○	○	○	○	○	
	Cleaning & degaussing of video disk ass'y	——	○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Driving System	Loading belt (synchro belt)	3-684-264-11	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	This cleaning must be done whenever a repair is made.
	Cleaning of iron core and opening of solenoid	——	–	–	–	○	–	–	–	○	–	–	Wipe iron core and opening of solenoid with dry cloth.
Performance Confirmation	Abnormal sound		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension		–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to 3-13. Specified value: adjust to 31 – 35 g·cm (When measured with torque cassette tape)
	Confirmation of brake system		–	☆	–	☆	–	☆	–	☆	–	☆	
	Confirmation of record & playback functions		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.
	Measurement of forward torque		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 80 ± 5 g·cm (SL-0003C)

○ Cleaning ★ Replacement ☆ Confirmation

Note:

On overhaul

When overhauling the unit, replace parts as indicated in the above table.

3. CHECK, ADJUSTMENT, AND REPLACEMENT PROCEDURES

3-1. STATE OF WEAR OF VIDEO HEADS CHECK

As the accuracy of the check depends on the state of the heads and precision of the checker, the results should be taken only as an indication of the state of wear.

[Adjustment of video head checker]

1) Mechanical zero
   Verify that the pointer of the video head checker is at the mechanical zero position. If it is not at this position, adjust the mechanical zero control.
2) Battery voltage check
   Set the MODE switch to "BATT" and set the POWER switch to "ON". The deflection of the pointer should be within the range marked "BATT". If not, replace the battery (use a 6F22 battery) as follows.
3) Calibration check
   Set the POWER switch to "ON" and the MODE switch to "CAL", then adjust the CAL control so that the pointer is on the CAL mark.
   Note 1: Be sure to carry out this adjustment whenever the RANGE switch is changed.
   Note 2: Be sure to check CAL before measuring the head and proceed the measurement after adjusting CAL, if CAL is not properly set.

[Method of measurement]

1) Remove the two screws that hold the damper assembly in place, then remove the damper assembly.
2) Detach the lead wires on the 2 video heads.
3) Attach the measuring clips to the head leads.
   Be sure to separate the leads by at least 1.5 cm.
4) Set RANGE switch to "B" and MODE switch to "MEAS". The pointer will deflect to indicate the state of wear of the heads.
   Note: The deflection for the 2 video heads may be different, so be sure to measure both.

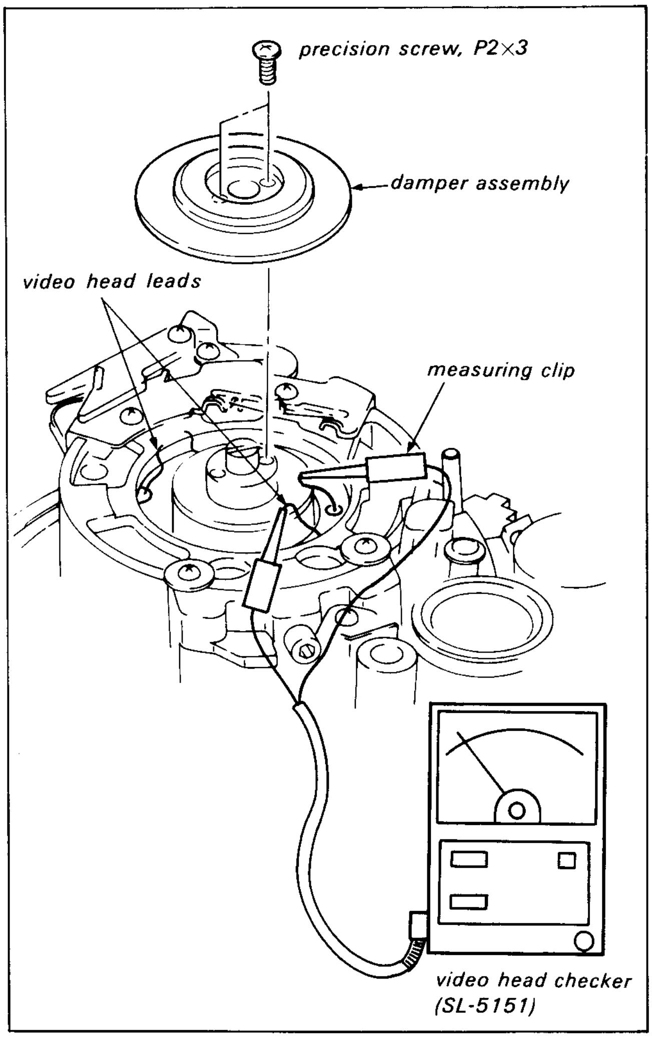

precision screw, P2×3
damper assembly
video head leads
measuring clip
video head checker
(SL-5151)

Fig. 3-1

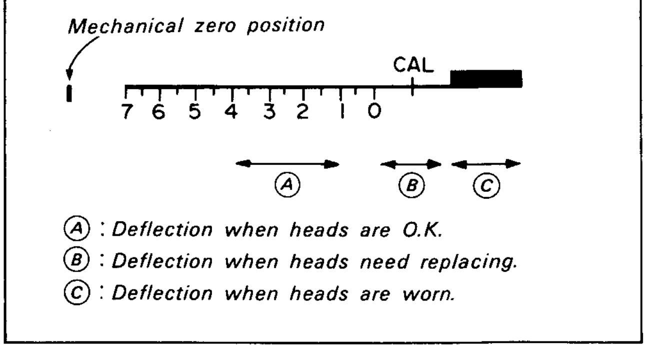

Mechanical zero position
CAL
7 6 5 4 3 2 1 0
Ⓐ
Ⓑ
Ⓒ
Ⓐ : Deflection when heads are O.K.
Ⓑ : Deflection when heads need replacing.
Ⓒ : Deflection when heads are worn.

Fig. 3-2 Measured value

3-2. REPLACING ROTARY HEAD DISK ASSEMBLY

Accessory adjusting jig: Feeler gauge 1, feeler gauge 2

Note:
Keep them after replacing the rotary head disk, since they will be needed when replacing the guide arm assembly and the rotary coupler assembly. (They are not delivered with the guide arm assembly or the rotary coupler assembly.)

3-2-1. Removing Rotary Head Disk Assembly (See Fig. 3-3)

Note:
While removing the rotary head disk assembly, never move screws ❽ clamping the guide arm assembly. If they are moved, a centering adjustment will be required later. (Refer to Paragraph 3-3-3.)

1) Unscrew two screws ❶ clamping the damper assembly, and remove the damper assembly.
2) Unscrew hex. socket head bolt ❷ with an Allen wrench.
3) Unscrew two screws ❸ , and remove the upper drum assembly.
   Note:
   Remove while turning the upper drum assembly, taking care not to move the adjust plate. If the adjust plate is moved, the tape pass is badly influenced (See Fig. 3-13).
4) Unsolder the four connection pins ❹ from the coupler disk.
5) Unscrew two hex. socket head bolts ❺ , and remove the rotary coupler assembly.
   Note:
   To be able to refit the rotary coupler in the correct relative position, memorize the position relative to connection pins 4 .
6) Unsolder the red, white, and black leads at four positions from the intermediary board of the rotary head disk.
7) Unscrew four hex. socket head bolts ❼ , and remove the rotary head disk assembly.

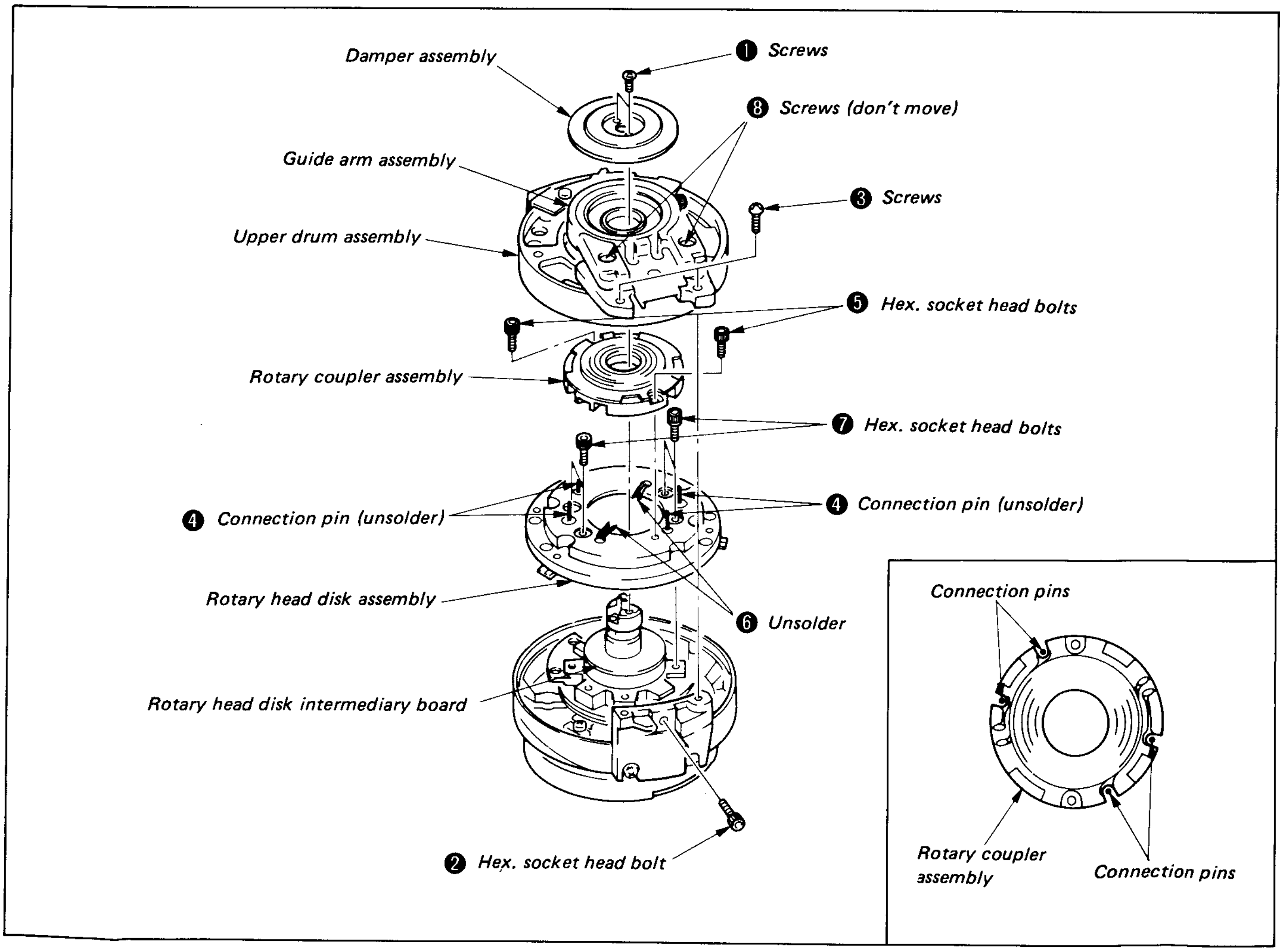

Damper assembly
❶ Screws
❽ Screws (don't move)
Guide arm assembly
❸ Screws
Upper drum assembly
❺ Hex. socket head bolts
Rotary coupler assembly
❼ Hex. socket head bolts
❹ Connection pin (unsolder)
❹ Connection pin (unsolder)
Rotary head disk assembly
❻ Unsolder
Rotary head disk intermediary board
❷ Hex. socket head bolt
Connection pins
Rotary coupler assembly
Connection pins

Fig. 3-3 How to remove rotary head disk

3-2-2. Refitting Rotary Head Disk Assembly

Note:

Be extremely careful not to damage the head chip by touching or fouling it.

1) Solder the four leads to the video head of the rotary head disk assembly. (Caution on correct orientation of the magnet.) Thread the leads through the holes (See Fig. 3-4).
2) Refit the four connection pins to the rotary head disk assembly (See Fig. 3-5).
3) Bend the connection pins and solder them to the AFM heads (See Fig. 3-5).
4) Refit the rotary head disk assembly, paying attention to the positions of the red, white, and black leads, and to the orientation of the connection pins. (White on Ach side)
5) Tighten four hex. socket head bolts ❼ (see Fig. 3-3), and solder the leads to the head intermediary board of rotary head disk (See Fig. 3-6-a).
6) Refit the rotary coupler assembly, and tighten two hex. socket head bolts ❺ (See Fig. 3-3).

   Note:

   Align A-a and B-b between the intermediary board of rotary head disk and the rotary coupler assembly (See Fig. 3-6).
7) Solder the four connection pins to the rotary coupler assembly (See Fig. 3-6-b).
8) Refit the upper drum assembly without moving the adjust plate, and lightly tighten screws ❸ . Tighten hex. socket head bolt ❷ , and then, tighten screws ❸ firmly (See Fig. 3-3).

   Note:

   While refitting the upper drum assembly, take care not to foul the head chip.
9) Check the AFM rotary transformer gap with the feeler gauges (See Fig. 3-7). Feeler 1 must go in and feeler 2 must not go in. If the gap is incorrect, readjust the gap. (Refer to Paragraph 3-2-3).
10) Refit the damper assembly, and tighten screw ❶ (See Fig. 3-3).

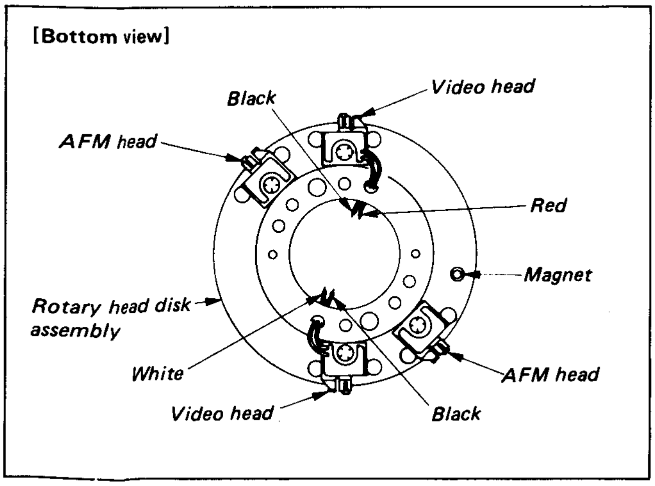

[Bottom view]
Black
Video head
AFM head
Red
Magnet
Rotary head disk assembly
White
AFM head
Video head
Black

Fig. 3-4 How to refit rotary head disk (1)

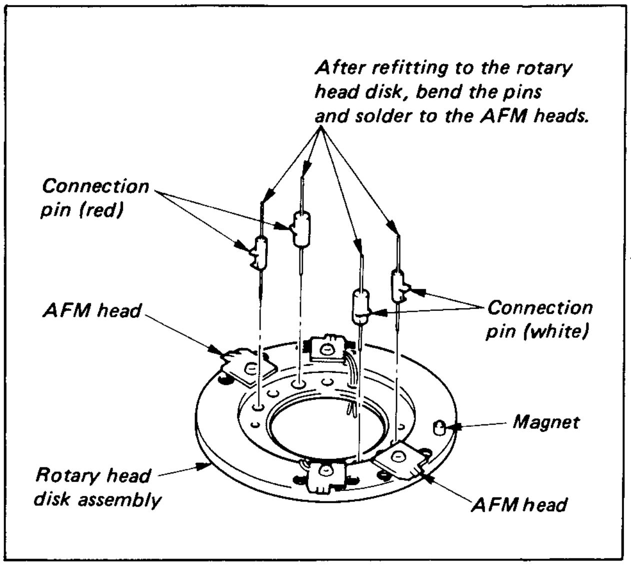

After refitting to the rotary head disk, bend the pins and solder to the AFM heads.
Connection pin (red)
AFM head
Connection pin (white)
Magnet
Rotary head disk assembly
AFM head

Fig. 3-5 How to refit rotary head disk (2)

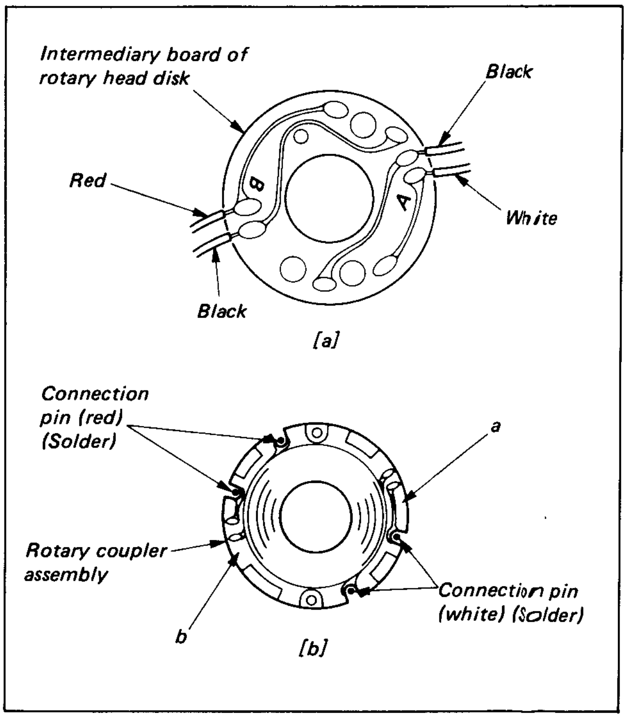

Intermediary board of rotary head disk
Black
Red
B
A
White
Black
[a]
Connection pin (red) (Solder)
a
Rotary coupler assembly
Connection pin (white) (Solder)
b
[b]

Fig. 3-6 How to refit rotary head disk (3)

3-2-3. Adjusting AFM Rotary Transformer Gap (See Fig. 3-7)

1) Loosen hex. socket head bolt ❶ for the guide arm assembly without unscrewing, and lift the upper ring assembly slightly.
2) Insert feeler gauge 1 into the gap in the rotary transformer, and push the upper ring assembly downward.
   Note: Take care not to tilt the upper ring assembly.
3) Tighten the hex. socket head bolt ❶ while holding the upper ring assembly down.
   Note:
   Take care not to move the upper ring assembly while tightening the bolt.
4) Remove feeler gauge 1, and ascertain that feeler gauge 2 does not enter the gap. If it enters, start readjusting from process 1) on.

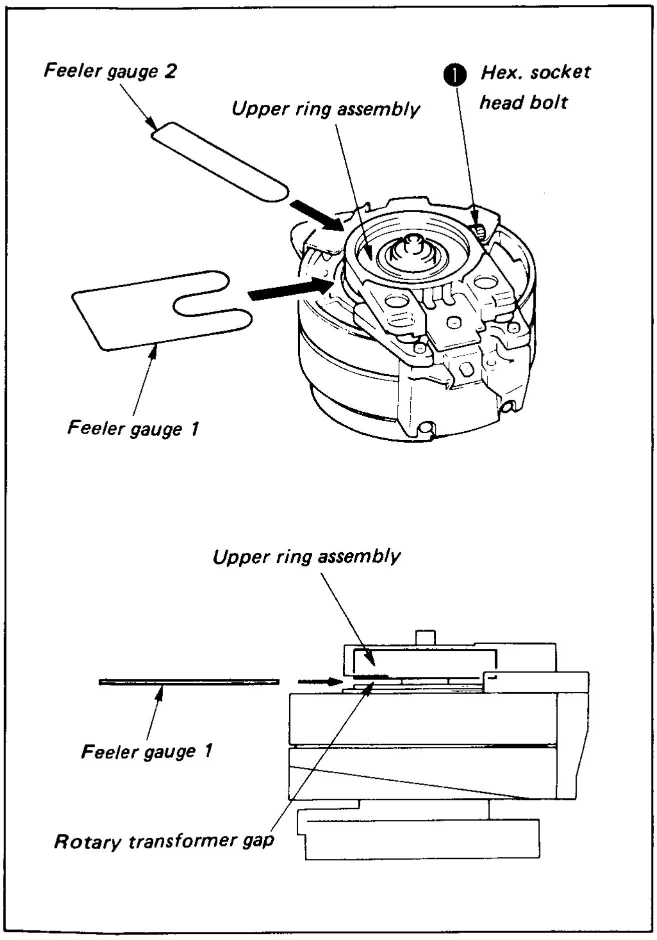

Feeler gauge 2
❶ Hex. socket head bolt
Upper ring assembly
Feeler gauge 1
Upper ring assembly
Feeler gauge 1
Rotary transformer gap

Fig. 3-7 Adjusting AFM rotary transformer gap

3-3. REPLACING UPPER DRUM

Accessory adjusting jig: Centering jig

Note:
Keep it carafully after replacing the upper drum, as it will be used again when replacing the guide arm assembly. (It does not accompany the guide arm assembly.)

3-3-1. How to Remove Upper Drum (See Fig. 3-8)

Note:
While removing the upper drum, never move hex. socket head bolt ❼. If it is moved, the gap in the rotary transformer must be adjusted later. (Refer to Paragraph 3-2-3.)

1) Unscrew two screws ❶ and remove the damper assembly.
2) Unscrew two screws ❷ , and remove the guide arm assembly.
3) Unscrew hex. socket head bolt ❸ with an Allen key.
4) Unscrew two screws ❹ , and remove the upper drum together with the upper drum mounting plate.
   Note:
   Be extremely careful not to touch parts around the drum.
5) Unscrew two screws ❺ , and remove the upper drum mounting plate from the upper drum.
6) Unscrew two screws ❻, and remove the tape retainer spring assembly.

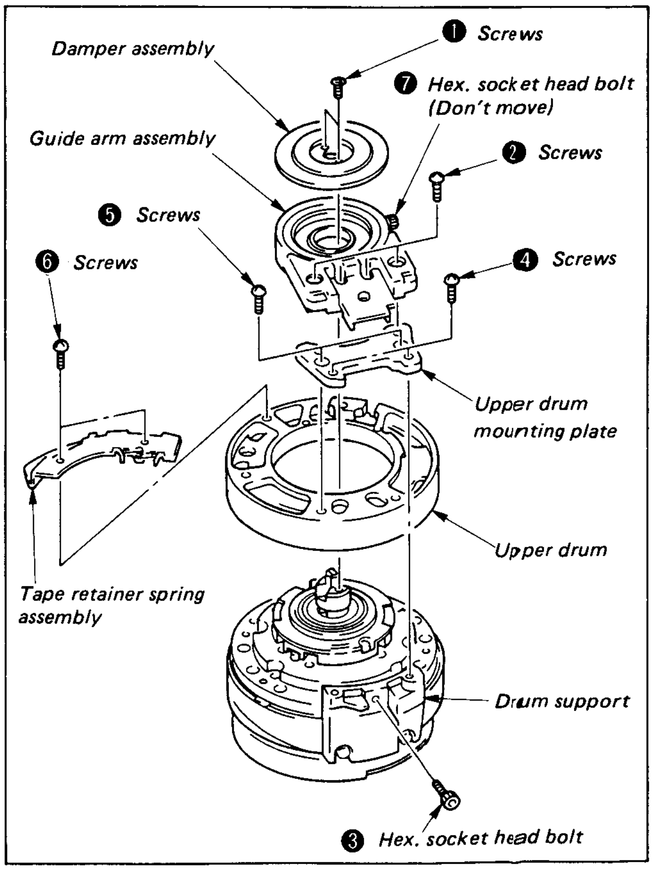

Damper assembly
❶ Screws
❼ Hex. socket head bolt (Don't move)
Guide arm assembly
❷ Screws
❺ Screws
❻ Screws
❹ Screws
Upper drum mounting plate
Upper drum
Tape retainer spring assembly
Drum support
❸ Hex. socket head bolt

Fig. 3-8 How to remove upper drum

3-3-2. How to Refit Upper Drum (See Fig. 3-8)

1) Fit the tape retainer spring assembly to the replacement upper drum with two screws ❻.
2) Refit the upper drum mounting plate with two screws ❺.
3) Lightly clamp the upper drum mounting plate installed to the upper drum to the drum support with two screws ❹.
4) Tighten hex. socket head bolt ❸ while holding the upper drum and the upper drum mounting plate tightly onto the drum support by hand.
5) Firmly tighten two screws ❹.
6) Refit the guide arm assembly with two screws ❷.
   Note:
   Don't firmly tighten screws 2, but allow the guide arm assembly to move horizontally.
7) Insert the centering jig found in the box of the replacement upper drum between the guide arm assembly and the damper holder, and tighten screws ❷ firmly. Remove the centering jig, and check the clearance between the guide arm assembly and the damper holder for uniform distribution (See Fig. 3-8, 3-9).
8) Refit the damper assembly with two screws ❶.

3-3-3. Centering Adjustment (See Fig. 3-9)

1) Loosen the screw ❷ fastening the guide arm assy without removing the screw, enabling the guide arm assy to move horizontally.
2) Insert the centering jig supplied as an accessory in the gap between the guide arm assy and damper holder on the change upper drum.
3) Tighten the screw ❷ holding the centering jig.
4) Remove the centering jig and check that the gap between the guide arm assy and damper holder is uniform. Readjust starting 1) if the gap is not even.

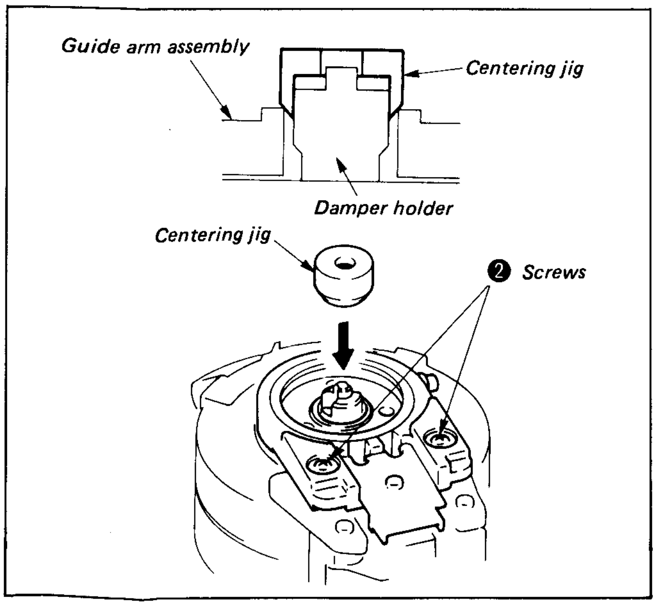


Fig. 3-9 Centering Adjustment

3-4. CAUTION WHEN CHANGING ROTARY COUPLER ASSY AND GUIDE ARM ASSY

1) Make sure to adjust the gap (refer to Paragraph 3-2-3) after changing the rotary coupler assy.
   The adjust jigs (spacers 1 and 2) can be found with the rotary head disk assy for repair (A-6762-226-A).
2) Make sure to adjust centering (refer to Paragraph 3-3-3) and gap (refer to Paragraph 3-2-3) after changing the guide arm assy.
   The adjust jigs (centering jig, feeler gauge 1 and 2) can be found with the upper drum for repair (A-6760-178-A) and rotary head disk assy for repair (A-6762-226-A). (Refer to Section 1-9)

3-5. VIDEO HEAD DIHEDRAL CHECK AND ADJUSTMENT

This adjustment is generally unnecessary, but it is sometimes necessary when the video head disk is replaced. (The video head disk used for maintenance has been precision adjusted at the factory using a microscope and almost never needs to be readjusted.)

When judging whether the video head dihedral angle is correct, the alignment tape is played back. When this is done the tracking control knob must be in the centering position. If the check is done with this knob in other than the center click position (if the tracking is off-center), even if the dihedral angle is correct the picture will be reproduced as if it were off.

Before this adjustment is performed, the ACE assembly position adjustment (refer to the section where the tape path adjustment is described) must be completed.

[Method of checking]

With the tracking control knob set to the center click position, play back the monoscope section of the alignment tape. Check to see if any of the vertical monoscope lines immediately below the switching pulse are reproduced double. If not, the dihedral angle is correct and does not have to be adjustment. If so, perform the adjustment as explained below.

[Adjusting method]

1) Insert the two dihedral adjusting screws (Jig Ref. No. J-10) into the adjusting screw holes on both sides of the video head –Ach (see Fig. 3-11) so that the tops of the adjusting screws flush with the upper face of the video head disk as shown in Fig. 3-10. (If screwing in is not sufficient, the video head disk does not rotate as the heads of the adjusting screws ram the upper drum. Conversely, if screwed in more than necessary, the head base is moved, and video head dihedral adjustment becomes very inaccurate.)

   Note:

   Be most careful the head under the part on the coupler board that is marked with white silk is the video head –Ach. The side marked b with white silk is the reference side. Never move it. (See Fig. 3-11.)

2) Of the two adjusting screws, screw in farther either one of them until resistance is felt. Screwing in the screw farther, the video head moves, and dihedral adjustment can be made. (See Fig. 3-12)
3) Play back the monoscope signal part of the alignment tape with the adjusting screw on and check the signal. Rotate the screwed in adjusting screw counterclockwise to loosen it, then screw in the adjusting screw on the other side if the dihedral quantity of the vertical line has become larger than before making the adjustment.
4) Remove the adjusting screws and recheck after completing the adjustment.

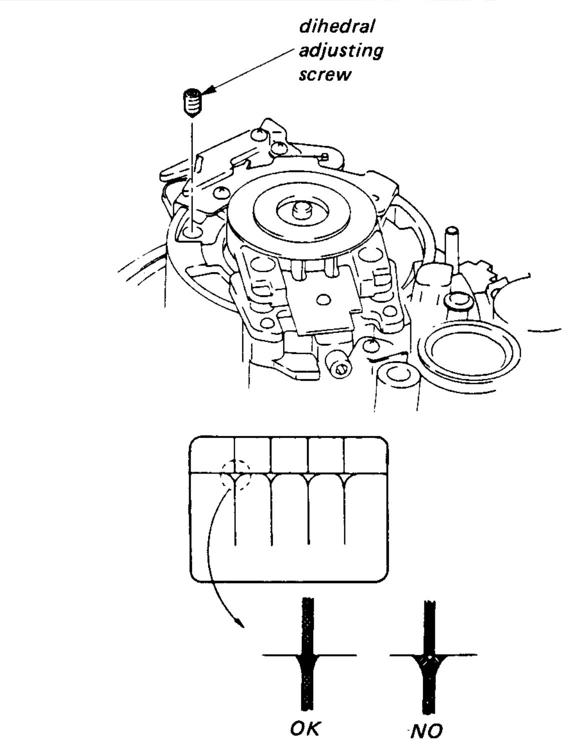

dihedral adjusting screw
OK
NO

Fig. 3-10 Video Head Dihedral Adjustment (1)

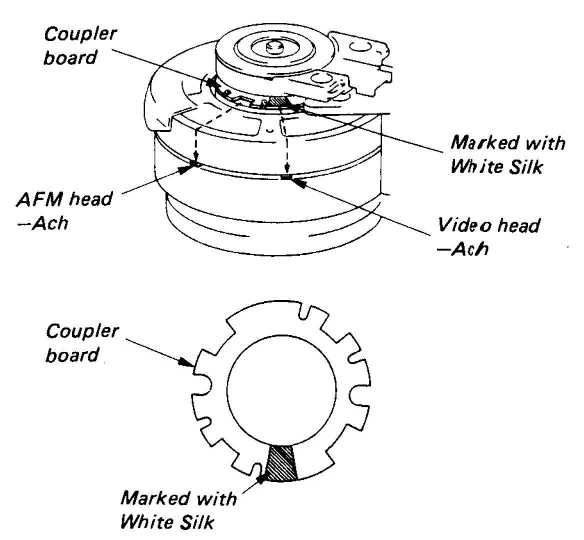

Coupler board
Marked with White Silk
AFM head –Ach
Video head –Ach
Coupler board
Marked with White Silk

Fig. 3-11 Video Head Dihedral Adjustment (2)

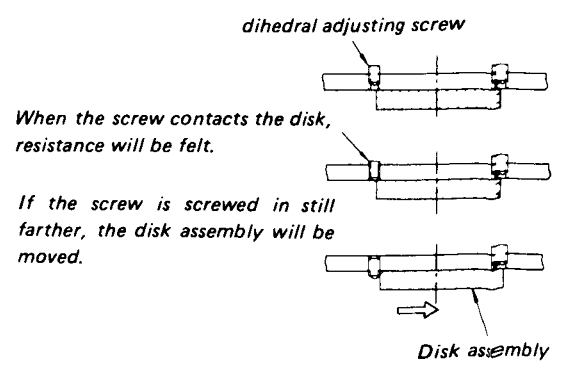

dihedral adjusting screw
When the screw contacts the disk, resistance will be felt.
If the screw is screwed in still farther, the disk assembly will be moved.
Disk assembly

Fig. 3-12 Video Head Dihedral Adjustment (3)

3-6. REPLACEMENT AND ADJUSTMENT OF THE DRUM ASSEMBLY

3-6-1. Replacement of the Drum Assembly

❶ Measure gap Ⓐ between adjusting plate 2 and the upperdrum holder section and record the measurement.
Note:
The position where the adjusting plate is mounted has a large effect on the tape path, so this measurement must be performed.

❷ Measure gap Ⓑ between adjusting plate 3-1 and the upper drum holder section, and record the measurement.
Note:
The position where the adjusting plate is mounted has a large effect on the tape path, so this measurement must be performed.

❸ Remove the screws shown in Fig. 3-13, then remove the tape guide ground plate and adjusting plates 2 and 3-1.

❹ Remove the 3 connectors from the rear of the chassis as shown in Fig. 3-14.

❺ Remove the 3 drum mounting screws from the rear of the chassis, then remove the main body of the drum assembly. After the replacement has been completed, adjust the drum path.

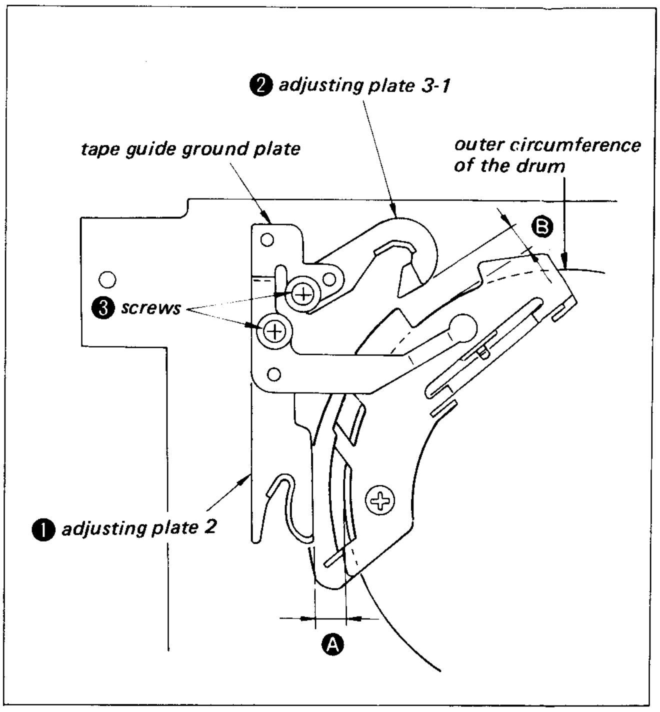

❷ adjusting plate 3-1
tape guide ground plate
outer circumference of the drum
Ⓑ
❸ screws
❶ adjusting plate 2
Ⓐ

Fig. 3-13 Measurement of the position of adjusting plates 2 and 3-1

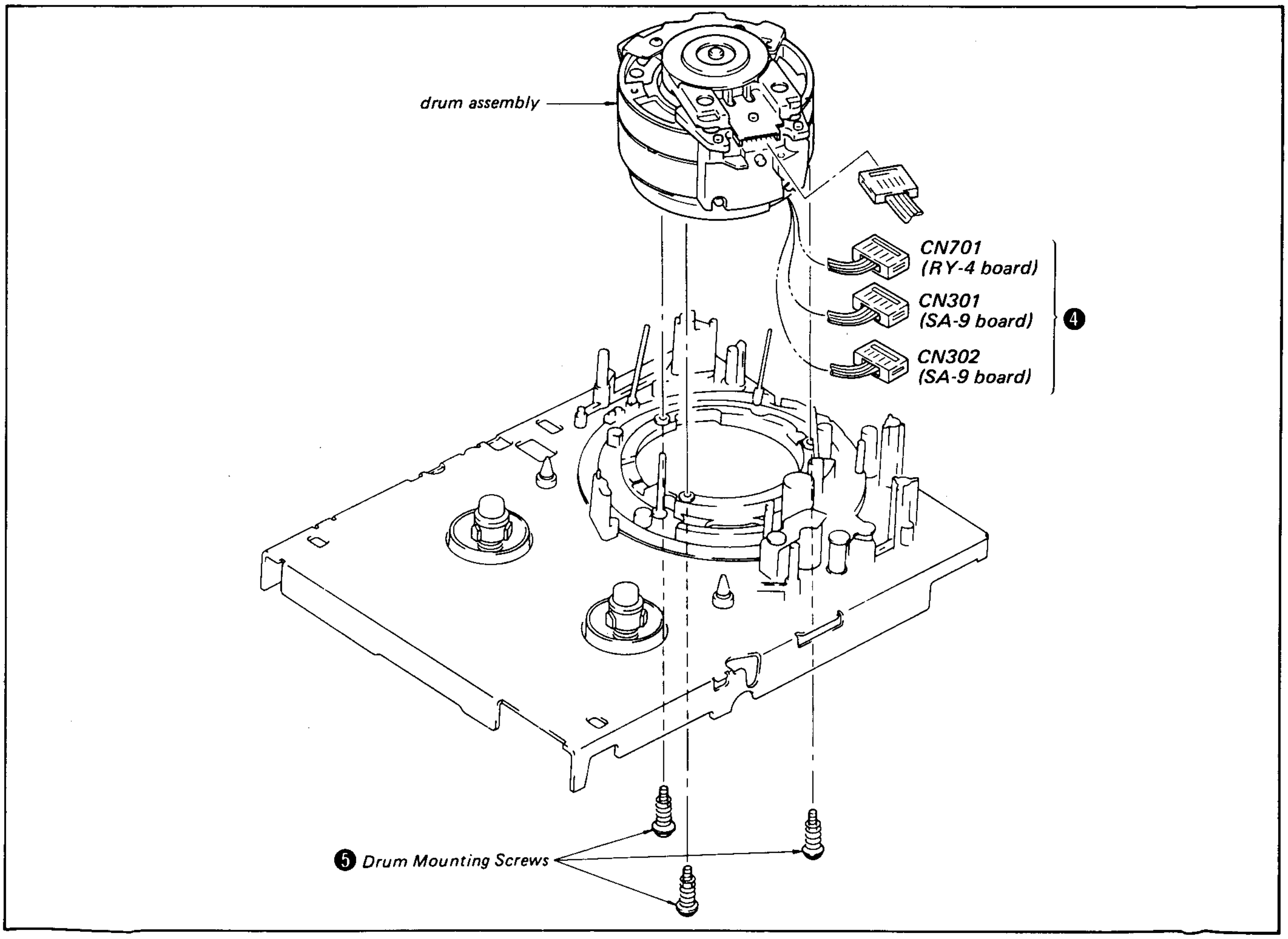

drum assembly
CN701
(RY-4 board)
CN301
(SA-9 board)
CN302
(SA-9 board)
❹
❺ Drum Mounting Screws

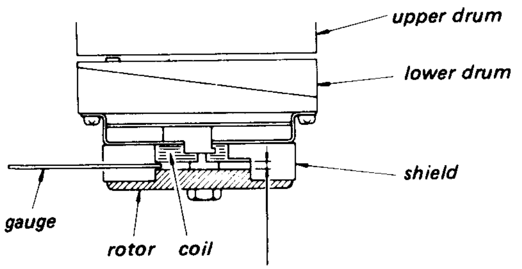
Fig. 3-14 Removal of the drum assembly

3-6-2. Adjustment of the Motor Gap when Replacing the Drum Assembly

After replacing the drum assembly, adjust the gap between the motor rotor and the coil to 0.3 mm to 0.6 mm (Fig. 3-15).

[Procedure]

1) When re-assembling the drum, use the spacers which were removed to produce a gap of between 0.3 mm and 0.6 mm. Measure the gap using the gauge that comes with the drum for assembly and maintenance use. One side of the gauge is 0.3 mm and the other side is 0.6 mm. If the gap is adjusted correctly, the 0.3 mm side should fit in and the 0.6 mm side should not.
2) If this fails to give the correct gap width, do not use the spacers which were removed; instead, use a combination of the 4 0.3 mm accessory spacers to obtain the correct width.


upper drum
lower drum
shield
gauge
rotor
coil

Insert clearance gauge between rotor and coil, and confirm that the space is more than 0.3 mm and less than 0.6 mm.

Fig. 3-15 Checking the motor gap width after replacing the drum assembly

Removal of the stator and rotor when replacing the drum

1) Remove the nut ❶ and washer ❷.
2) Remove the rotor ❸ from the stator ❹.
3) Remove the❷ screws ❺, then remove the stator from the main body of the drum.

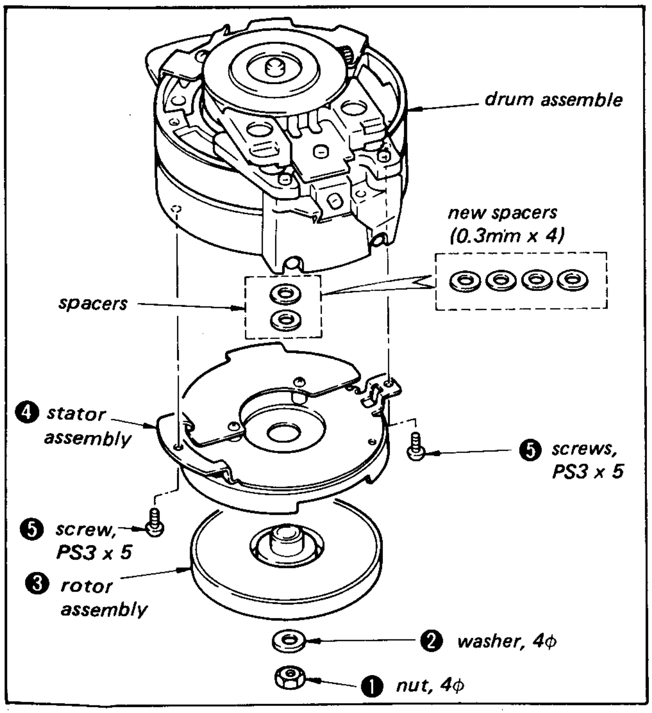

drum assemble
new spacers (0.3mm x 4)
spacers
❹ stator assembly
❺ screws, PS3 x 5
❺ screw, PS3 x 5
❸ rotor assembly
❷ washer, 4φ
❶ nut, 4φ

Fig. 3-16 Removal of the stator and rotor when replacing the drum

3-7. REPLACEMENT OF THE CAPSTAN MOTOR

3-7-1. Removal of the Capstan Motor (Fig. 3-17)

- Remove the three screws ❶ then remove the capstan motor from the rear of the mechanical chassis.

  Note:

  When the capstan motor has been removed or replaced, check the tape path once.

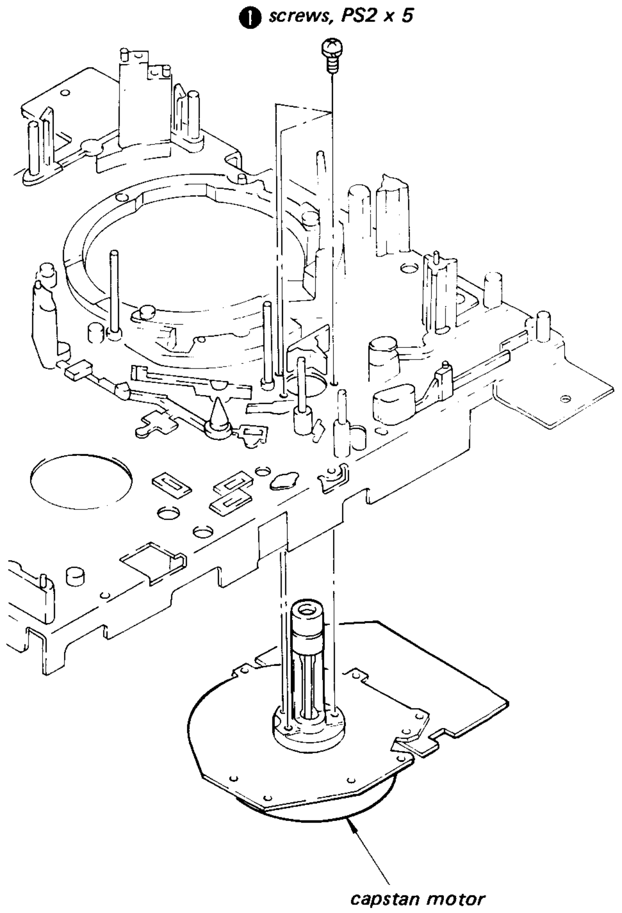

❶ screws, PS2 x 5
capstan motor

Fig. 3-17 Removal of the capstan motor

3-8. REMOVAL OF THE S COIL SENSOR (Fig. 3-18)

❶ Remove the spring.
❷ Remove the claw in the direction of arrow Ⓐ,then pull the S coil sensor out.
❸ Pull out the connector from CN604 on SA-9 board.

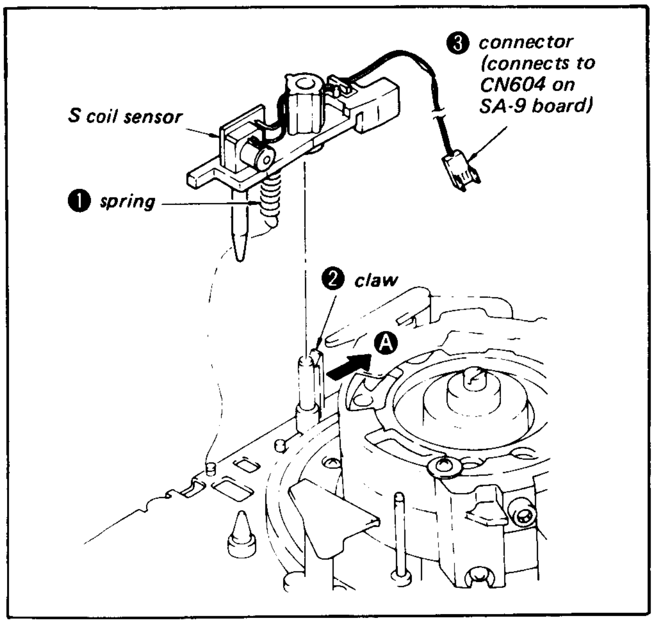

❸ connector (connects to CN604 on SA-9 board)
S coil sensor
❶ spring
❷ claw
Ⓐ

Fig. 3-18 Removal of the S coil sensor

3-9. REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY

Refer to SECTION 2 DISASSEMBLY, 2-10 REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY.

3-10. ADJUSTMENT OF THE FL CASSETTE COMPARTMENT

3-10-1. Adjustment of the Position of the Right Gear of the FL Cassette Compartment Assembly

In the FL cassette compartment assembly, the cassette holder must always move parallel to the mechanical chassis. The gear system is used to contorl the amount by which the cassette holder advances so that this will be the case. Consequently, if the gears in this section slip out of mesh, the next time the unit is assembled the gear mesh must be adjusted to the correct position; otherwise the cassette will not feed properly.

[Adjustment of the gear positions]

❶ Get a positioning rod about 200 mm long and 1.5 mm in diameter ready.

❷ While passing the positioning rod through the combination of the drive arm right and cassette ON cam, fit the latter on the right side plate. Similarly, fit the drive arm left onto the left side plate.

❸ Similarly, while passing the positioning rod through the worm wheel, fit the latter onto the right side plate.

❹ Similarly, while passing the positioning rod through the combination of the limiter gear and cassette OFF cam, fit the latter onto the right side plate.

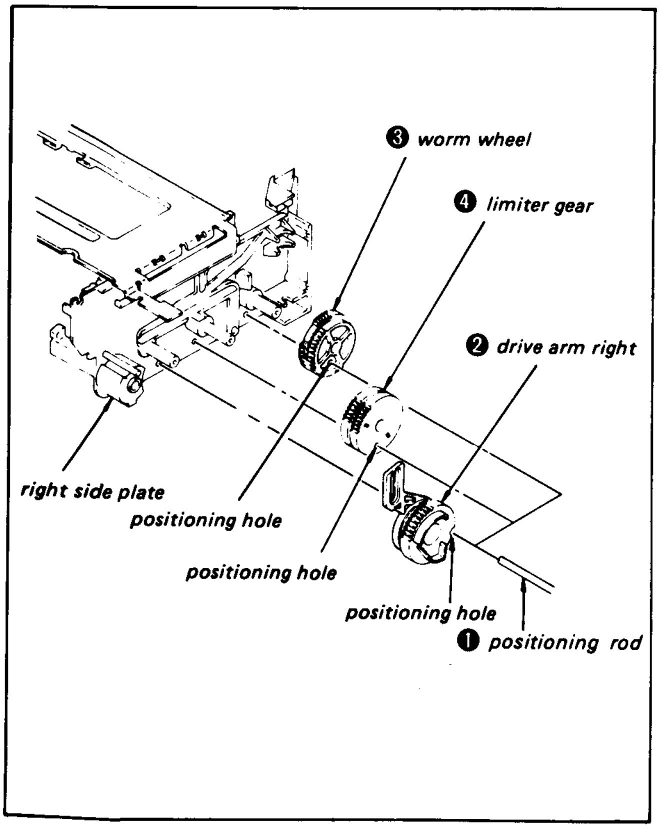

❸ worm wheel
❹ limiter gear
❷ drive arm right
right side plate
positioning hole
positioning hole
positioning hole
❶ positioning rod

Fig. 3-19 Positioning of the FL cassette compartment gears

3-10-2. Cassette ON Switch Operation Check and Adjustment

[Method of checking]

When inserting a cassette into the FL cassette compartment assembly, confirm that, as the cassette is inserted, the leaf switch comes ON when the center of the drive roller is 8 to 13 mm from the end of the guide groove, as shown in Fig. 3-20.

[Method of adjustment]

Bend the tip of the cassette ON switch in the direction of the arrow.

Adjust so that the cassette ON switch comes ON when the above distance is 8 to 13 mm, and finally tighten the screw.

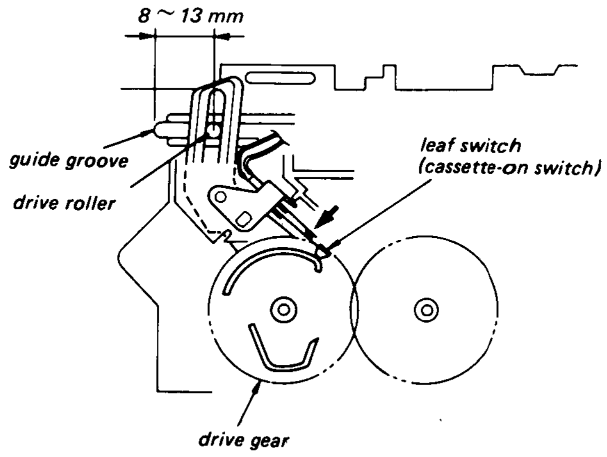

8 ~ 13 mm
guide groove
drive roller
leaf switch (cassette-on switch)
drive gear

Fig. 3-20 Cassette ON switch operation check and adjustment

3-10-3. Checking and Adjustment of the Cassette Door Assembly

[Method of checking]

With the door opening and closing arm returned all the way in the direction of arrow Ⓐ, check to make sure that the door is vertical.

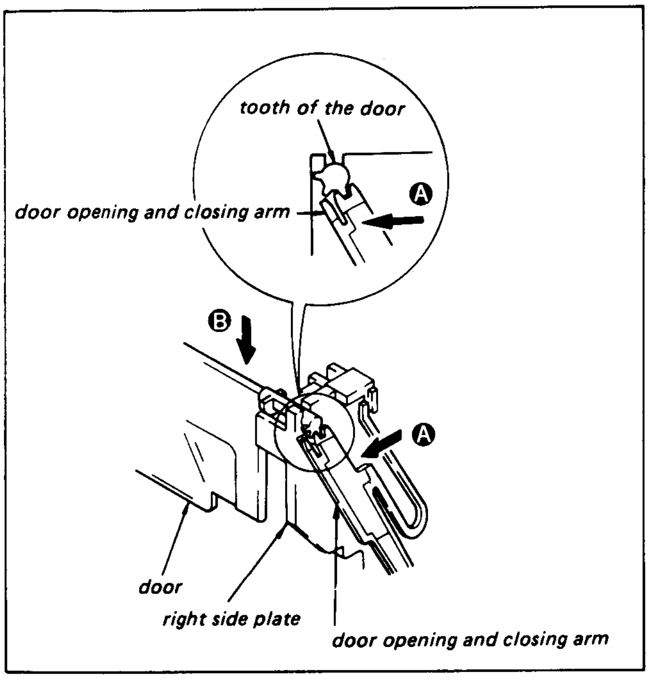

tooth of the door
door opening and closing arm
Ⓐ
Ⓑ
Ⓐ
door
right side plate
door opening and closing arm

Fig. 3-21 Adjustment of the position of the cassette door assembly

[Method of adjustment]

Check to make sure that the door opening and closing rack plate has returned all the way. Then, close the door together in the direction of arrow Ⓑ so that it is vertical, and mesh the gears.

3-10-4. Mounting the FL Cassette Compartment Assembly (Fig. 3-22)

❶ Hook the two holes of the FL cassette compartment assembly onto the mechanical chassis, then place the compartment in the specified position on the chassis.

❷ Loosely tighten the 4 mounting screws of the FL cassette compartment assembly. Move the FL cassette compartment assembly forward and backward with respect to the mechanical chassis, set it in the correct position, then tighten the mounting screws all the way.

❸ Connect the timing belt (loading belt) between the threading motor and the worm gear, then hold it in place with the internal gear flange.

❹ Press the tension roller arm in the direction of the arrow to adjust the tension of the timing belt (loading belt), then fix it in place with the arm fixing screw.

❺ Insert the harness sticking out from the FL cassette compartment into connector CN606 on SA-9 board.

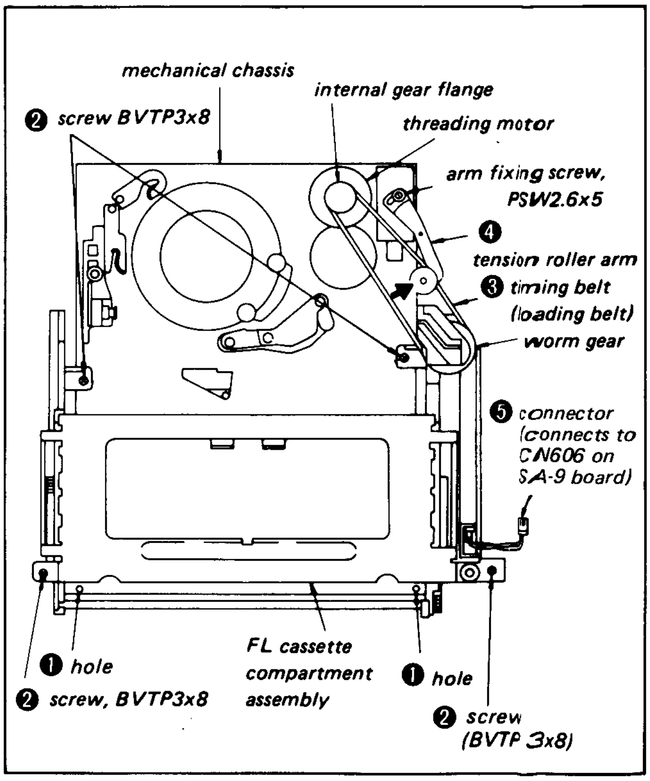
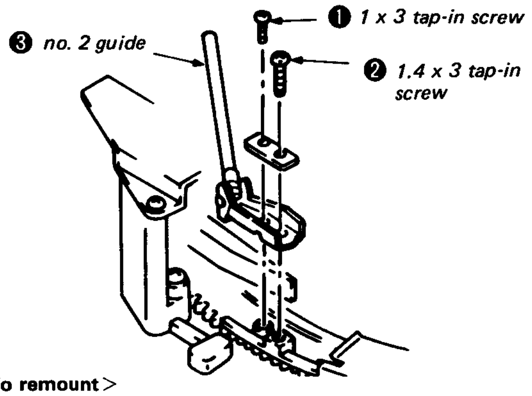

mechanical chassis
internal gear flange
❷ screw BVTP3x8
threading motor
arm fixing screw, PSW2.6x5
❹ tension roller arm
❸ timing belt (loading belt)
worm gear
❺ connector (connects to CN606 on SA-9 board)
❶ hole
❷ screw, BVTP3x8
FL cassette compartment assembly
❶ hole
❷ screw (BVTP 3x8)

Fig. 3-22 Mounting the FL cassette compartment assembly

3-11. REMOVAL OF THE No. 2 AND No. 3 GUIDES

3-11-1. Removal of the No. 2 Guide

❶ Remove the 1x3 tap-in screw.
❷ Remove the 1.4x3 tap-in screw.
❸ REmove the No. 2 guide assembly.


❸ no. 2 guide
❶ 1 x 3 tap-in screw
❷ 1.4 x 3 tap-in screw

<To remount>

1) Loosely tighten the 1 x 3 tap-in screw.
2) Tighten the 1.4 x 3 tap-in screw all the way.
3) Adjust the 1 x 3 tap-in screw until the height is 35 mm. After adjustment, lock the screw.
Note: The no. 2 guide is up all the way.

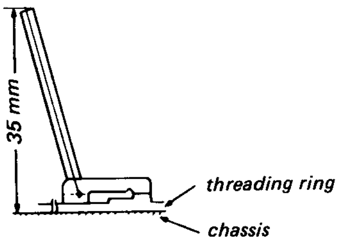
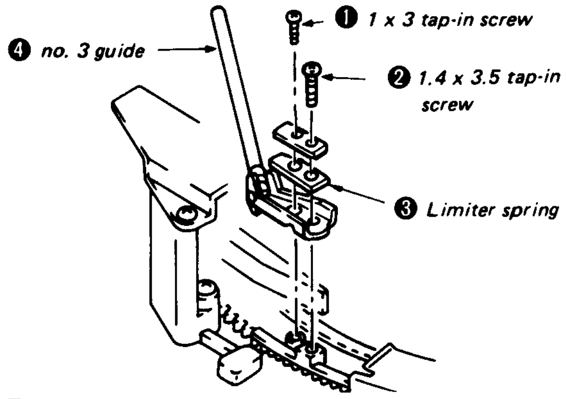

35 mm
threading ring
chassis

Fig. 3-23 Removal of the no. 2 guide

3-11-2. Removal of the No. 3 Guide

❶ Removė the 1x3 tap-in screw.
❷ Remove the 1.4x3.5 tap-in screw
❸ Remove the limiter spring.
❹ Remove the No. 3 guide assembly.


❹ no. 3 guide
❶ 1 x 3 tap-in screw
❷ 1.4 x 3.5 tap-in screw
❸ Limiter spring

<To remount>

1) Loosely tighten the 1 x 3 tap-in screw.
2) Tighten the 1.4 x 3.5 tap-in screw all the way.
3) Adjust the 1 x 3 tap-in screw so that the height is 30 mm. After adjustment, lock the screw.
Note: The no. 3 guide is up all the way.

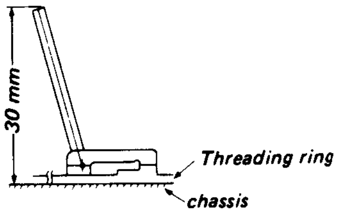

30 mm
Threading ring
chassis

Fig. 3-24 Removal of the no. 3 guide

3-12. REPLACEMENT AND ADJUSTMENT OF THE S THREADING RING

3-12-1. Preparation to Remove the S Therading Ring, Removal of the ACE Assembly, FE Head and Threading Motor (Fig. 3-25)

❶ Remove the cross-recessed head screw.
❷ Remove the No. 6 guide nut.
❸ Remove the No. 6 washer.
❹ Remove the No. 6 guide spacer.
❺ Remove the compression coil spring.
❻ Remove the 2 guide adjustment screws, then remove the ACE assembly and the FE head.

Note:
Since the ACE assembly and the FE head are connected by a lead wire, be careful when removing them. It is not necessary to remove the compression coil spring below the ACE assembly, but be careful not to use it.

❼ Remove the 3 screws, then remove the threading motor assembly by pulling it up and out.

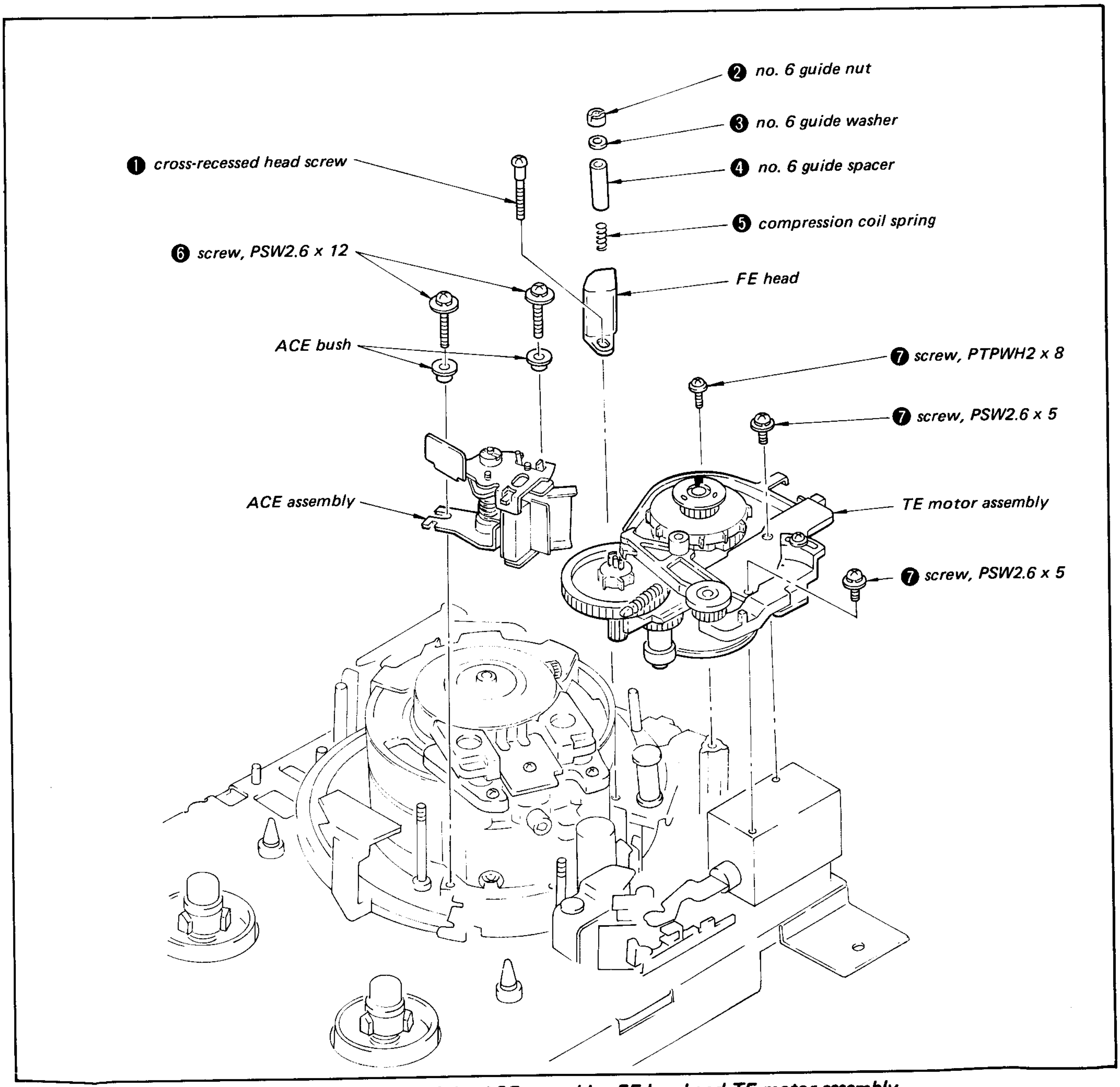

❷ no. 6 guide nut
❸ no. 6 guide washer
❶ cross-recessed head screw
❹ no. 6 guide spacer
❺ compression coil spring
❻ screw, PSW2.6 x 12
FE head
ACE bush
❼ screw, PTPWH2 x 8
❼ screw, PSW2.6 x 5
ACE assembly
TE motor assembly
❼ screw, PSW2.6 x 5

Fig. 3-25 ***Removal of the ACE assembly, FE head and TE motor assembly.***

Removal of Miscellaneous Parts (Fig. 3-26)

Proceeding in the same manner as in replacement of the drum assembly, measure the width of the gap between the upper drum and the adjusting plates (Fig. 3-13).

❶ Remove the screw, then remove the tape guide ground plate and adjusting plates 3-1 and 2.
❷ Remove the two screws, then remove the tape holder assembly.
❸ Remove the screw, then remove the guide plate.
❹ Remove the 2 PTPWH2x8 screws and the M2.6 screw, then remove shuttle guide 2.
❺ Remove the 3 PTPWH2x8 screws and the M2.6 screw. Then remove the 2 claws holding shuttle guide 1-YA in place, and finally remove shuttle guide 1-YA.
❻ Remove the slant base assembly.
❼ Remove the BVTT2.6x6 screw, then remove the pinch liner link.

Note:
After removing the guide plate, do not thread or unthread a tape with the shuttle guide mounted.

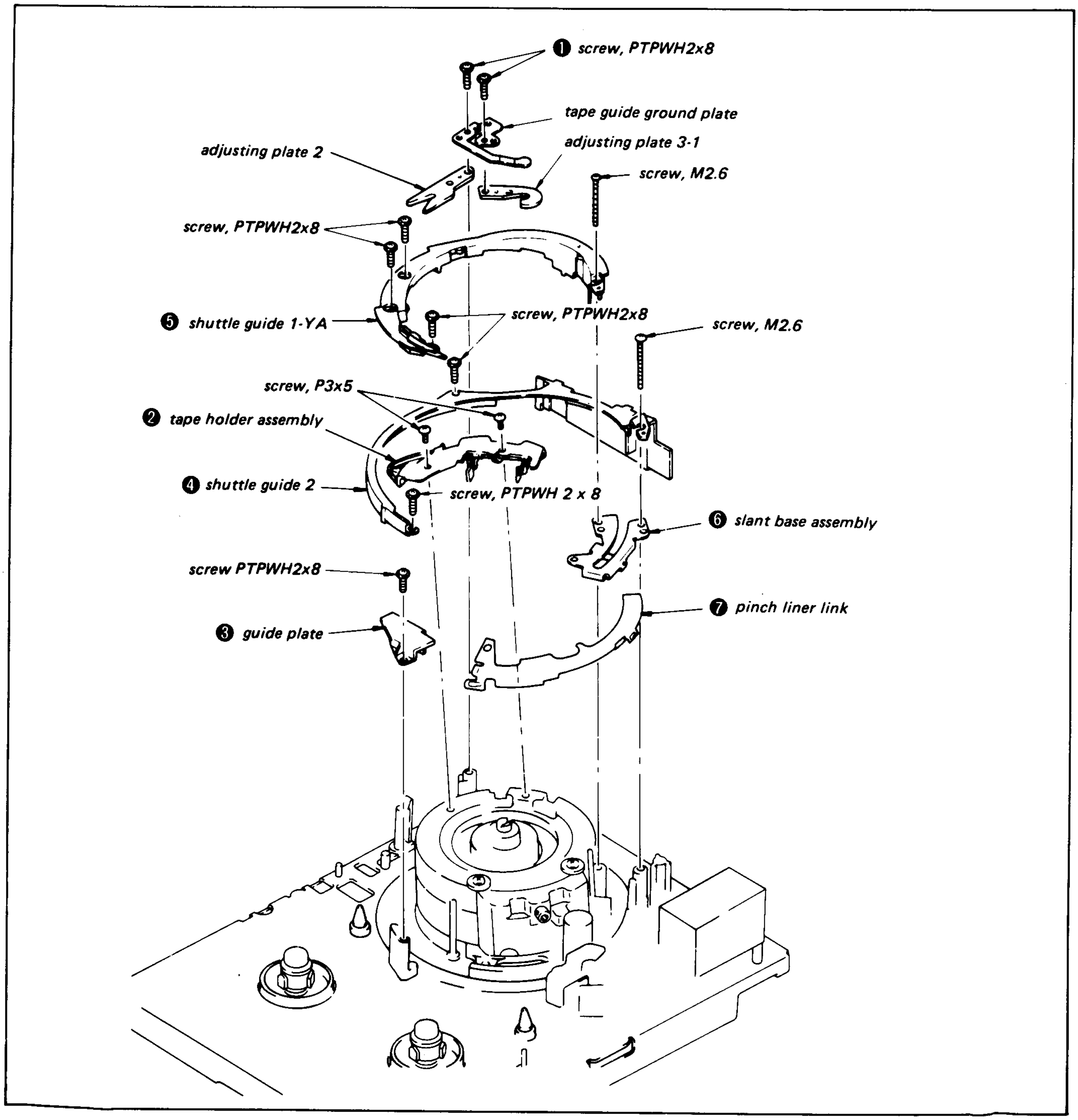

❶ screw, PTPWH2x8
tape guide ground plate
adjusting plate 3-1
adjusting plate 2
screw, M2.6
screw, PTPWH2x8
❺ shuttle guide 1-YA
screw, PTPWH2x8
screw, M2.6
screw, P3x5
❷ tape holder assembly
❹ shuttle guide 2
screw, PTPWH 2 x 8
❻ slant base assembly
screw PTPWH2x8
❼ pinch liner link
❸ guide plate

Fig. 3-26 Removal of miscellaneous parts

3-12-2. Removal of the S Threading Ring (Fig. 3-27)

❶ Turn the stop washer and remove the ring roller (B) and (C).

❷ Remove the screw. then remove the ring roller adjustment plate.

❸ Remove the S threading ring.

Note:

Once a stop washer has been removed, do not use it again.

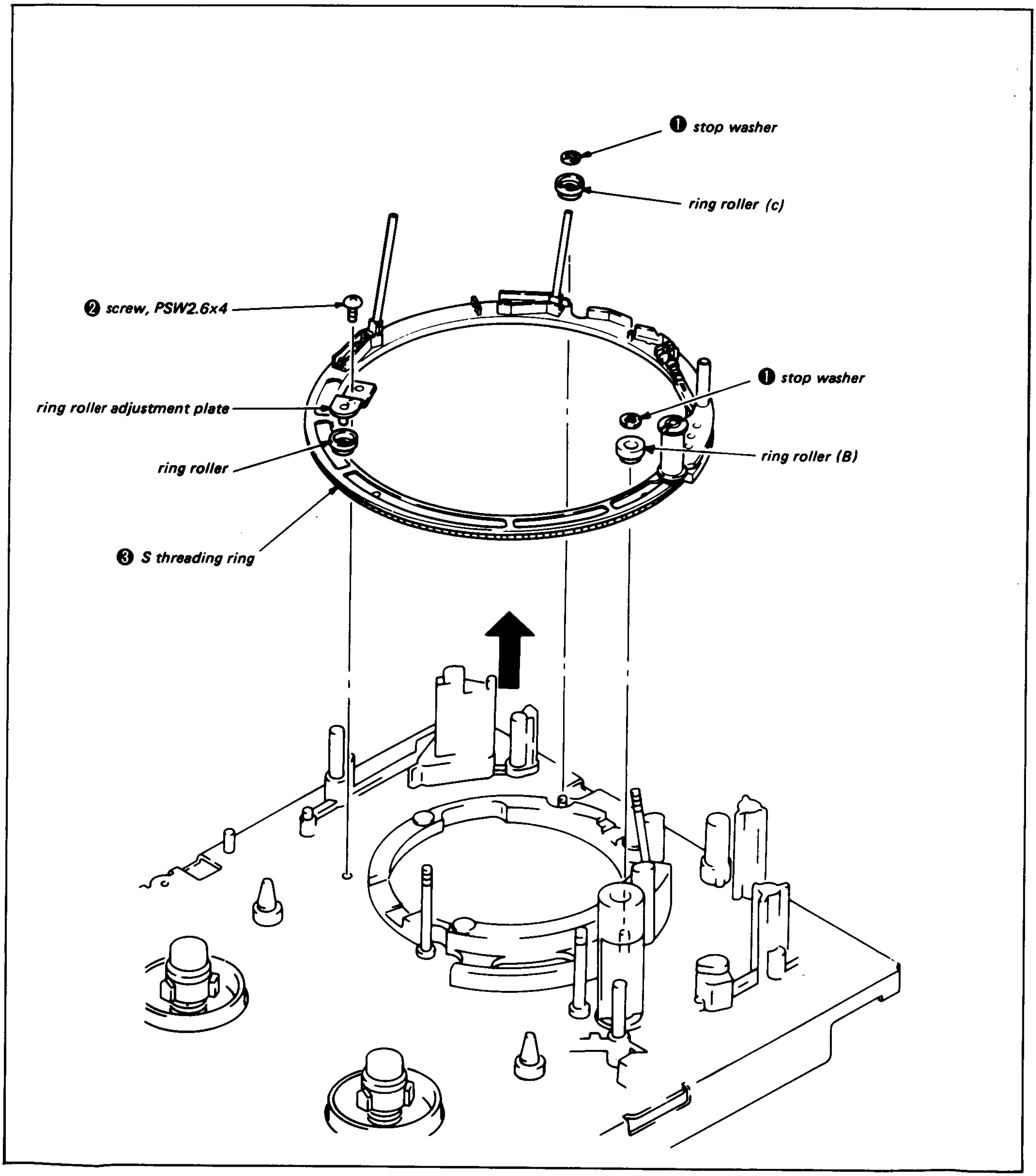

❶ stop washer
ring roller (c)
❷ screw, PSW2.6x4
❶ stop washer
ring roller adjustment plate
ring roller
ring roller (B)
❸ S threading ring

Fig. 3-27 ***Removal of the S threading ring***

3-12-3. S Threading Ring Mounting and Position Adjustment (Fig. 3-28)

❶ Set the slider gear assembly in the unthreading completed position.
(Slider gear assembly set so that it is up against part T slider stop mold.)

❷ In this condition, fit the threading ring into place, match the chassis hole (3ϕ) of part Ⓐ with the S threading ring hole (1.5ϕ), and mesh with the drive gear teeth.

❸ Attach ring roller (B) and fix in place with a stop washer.

❹ Attach the ring roller, and fix in place with the adjustment plate.

Note:

After replacement and mounting are completed, adjust the ACE assembly as explained in the section on tape path adjustment.

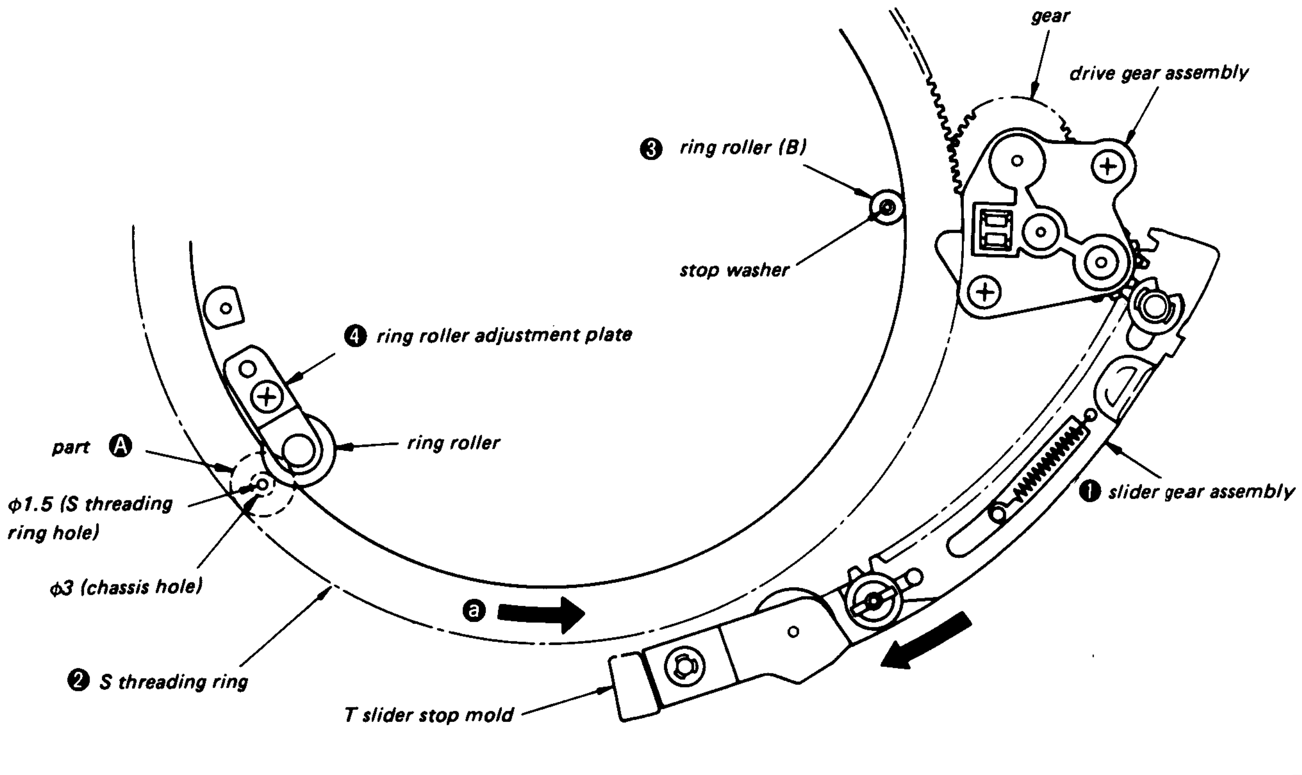

gear
drive gear assembly
❸ ring roller (B)
stop washer
❹ ring roller adjustment plate
part Ⓐ
ring roller
ϕ1.5 (S threading ring hole)
ϕ3 (chassis hole)
❶ slider gear assembly
ⓐ
❷ S threading ring
T slider stop mold

Fig. 3-28 S threading ring position adjustment

3-13. PINCH SNAP-FIT LIMITER GAP CHECK AND ADJUSTMENT

[Method of checking]

1) Set in the threading completed condition.
2) With the plunger pushed in all the way, confirm that the thickness of the pinch snap-fit limiter gap is 0.4 mm to 0.6 mm. If it is not, adjust as explained under [method of adjustment] below.

[Method of adjustment]

❶ With the pinch solenoid in the absorbed condition (when the plunger is pushed in all the way), loosen the adjustment screw.

❷ Press the pinch limiter adjustment plate in the direction of arrow ⓐ with an ordinary screwdriver, as in section Ⓐ in the diagram, and adjust until the thickness of the gap in 0.4 mm to 0.6 mm.
Tighten the adjustment screw and then lock it to fix everything in place.

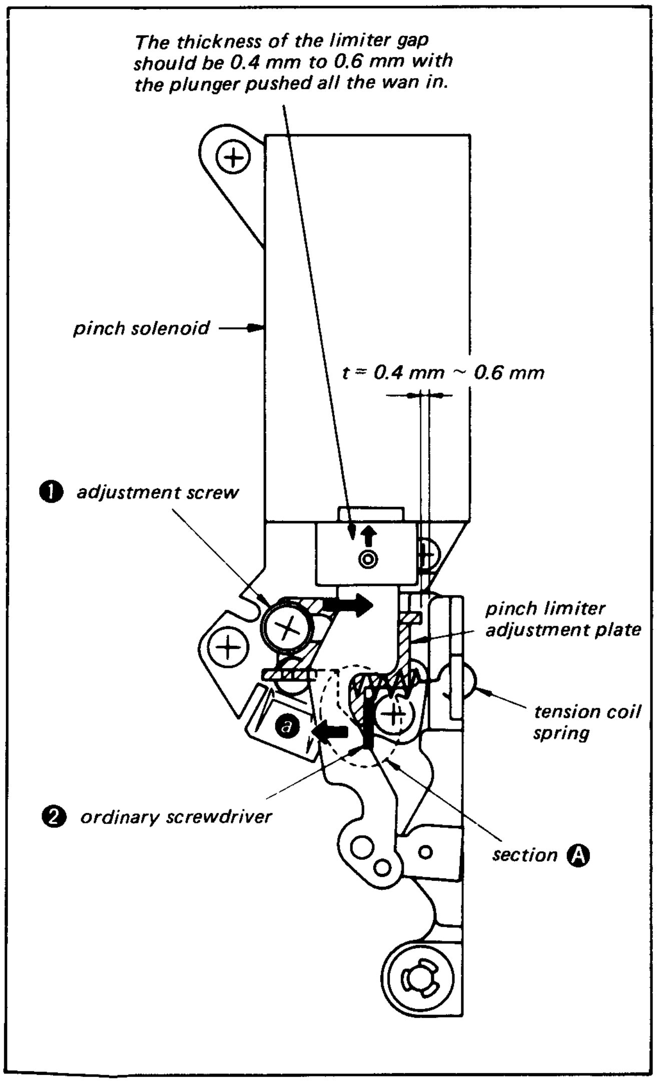

The thickness of the limiter gap should be 0.4 mm to 0.6 mm with the plunger pushed all the wan in.
pinch solenoid
t = 0.4 mm ~ 0.6 mm
❶ adjustment screw
pinch limiter adjustment plate
tension coil spring
a
❷ ordinary screwdriver
section Ⓐ

Fig. 3-29 Pinch snap-fit limiter gap adjustment plate

3-14. THREADING END SWITCH AND T COIL SENSOR

3-14-1. Threading End Switch (TE Switch) Position Check and Adjustment

[Method of checking]

Turn the S threading ring manually. Check to make sure that, when the lock roller moves from above the straight line part of the notch in the ring (Fig. 3-30 section Ⓐ) to 1/3 of the way down it and back, the TE switch turns ON and OFF.
If the lock roller has to move outside of this range before the switch will turn ON and OFF, adjust as explained below.

[Method of adjustment]

1) Set the lock roller between the top of the notch in the S threading ring and 1/3 of the way down it, turn the TE switch in the direction of the arrow and, when the switch turns ON, fix the TE switch in place.
2) When the adjustment is completed, repeat the check as described above [method of checking].

[Removal]

1) Remove the tension coil spring that is attached to the S coil sensor assembly, then remove the S coil sensor.
2) Remove the lock arm assembly in the direction of arrow Ⓐ.

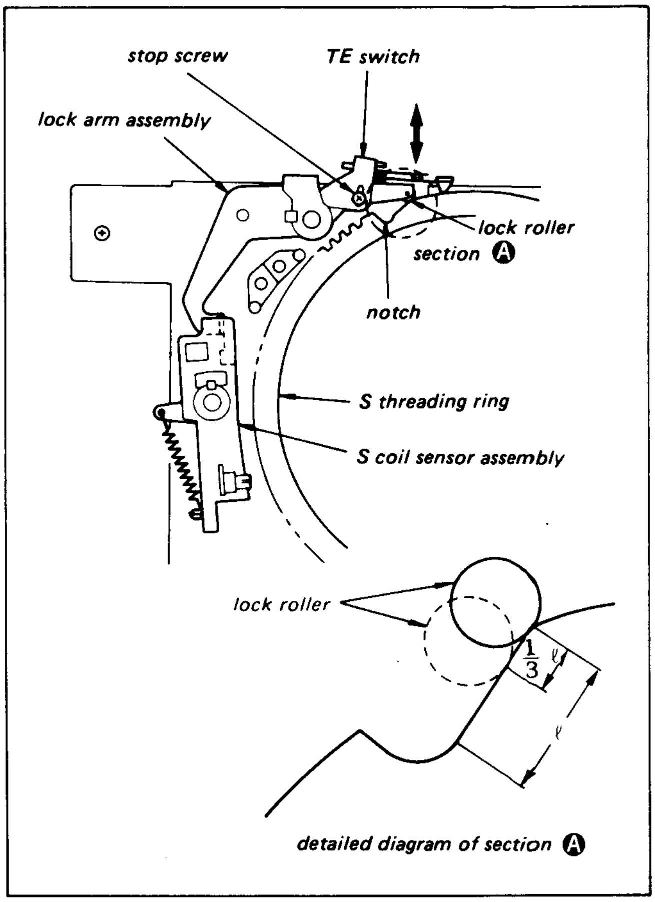

stop screw
TE switch
lock arm assembly
lock roller
section Ⓐ
notch
S threading ring
S coil sensor assembly
lock roller
$\frac{1}{3}\ell$
ℓ
detailed diagram of section Ⓐ

Fig. 3-30 TE switch position adjustment

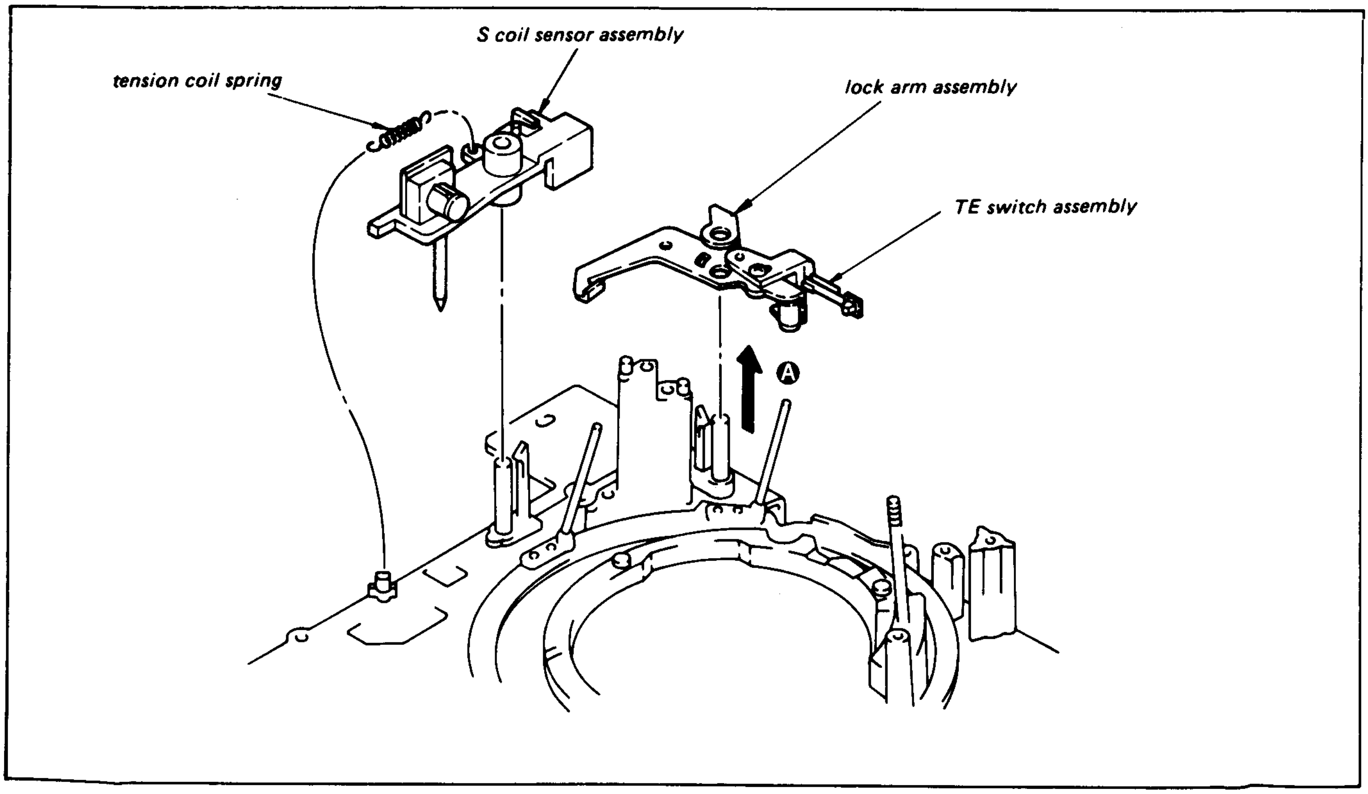

S coil sensor assembly
tension coil spring
lock arm assembly
TE switch assembly
Ⓐ

Fig. 3-31 Removal of the TE switch assembly and lock arm assembly

3-14-2. T Coil Sensor Mounting and Operation Check

[Method of checking]

Confirm that T coil sensor link ❶ is pressed and T coil sensor ❷ moves in the direction of arrow Ⓑ when the T slider gear assembly is moved in the direction of arrow Ⓐ .

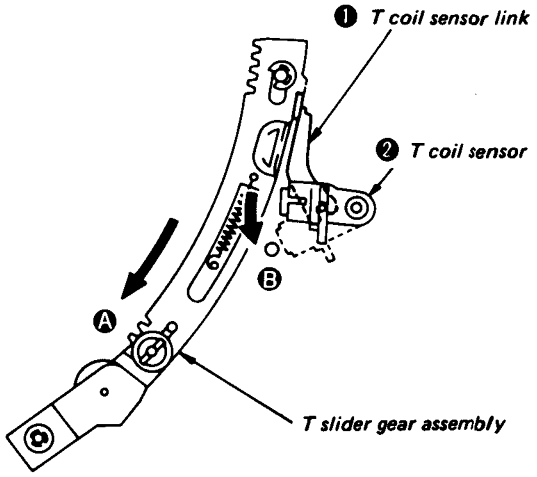

❶ T coil sensor link
❷ T coil sensor
Ⓑ
Ⓐ
T slider gear assembly

Fig. 3-32 T coil sensor operation check.

[Method of mounting]

❶ Place T coil sensor link in the prescribed position.
❷ Match up the T coil sensor hole with the chassis shaft Ⓐ and insert. Place so that it engages with T coil sensor link.
❸ Hook the tension coil spring on the T coil sensor and chassis claw.

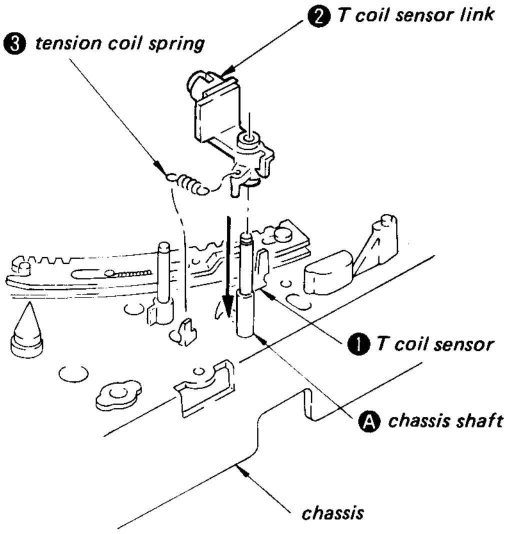

❷ T coil sensor link
❸ tension coil spring
❶ T coil sensor
Ⓐ chassis shaft
chassis

Fig. 3-33 T coil sensor link and T coil sensor mounting

3-15. REMOVAL AND ADJUSTMENT OF THE REEL BLOCK ASSEMBLY

3-15-1. Removal of the Reel Block Assembly

Refer to SECTION 2 DISASSEMBLY, 2-11 REMOVAL OF THE REEL BLOCK ASSEMBLY.

3-15-2. Adjustment of the Position of the Tension Regulating Lever

[Method of adjustment]

1) Put the unit in playback mode.
2) Loosen the adjustment spring until the tape guide pin of the tension regulating lever assembly is positioned to the outside of the outer circumference of shuttle guide 2. as shown in Fig. 3-34. Then adjust by moving the tension regulating band assembly in the direction of arrow Ⓐ .
3) After adjustment, tighten the adjustment screw, being careful that the tension regulating band assembly does not move.

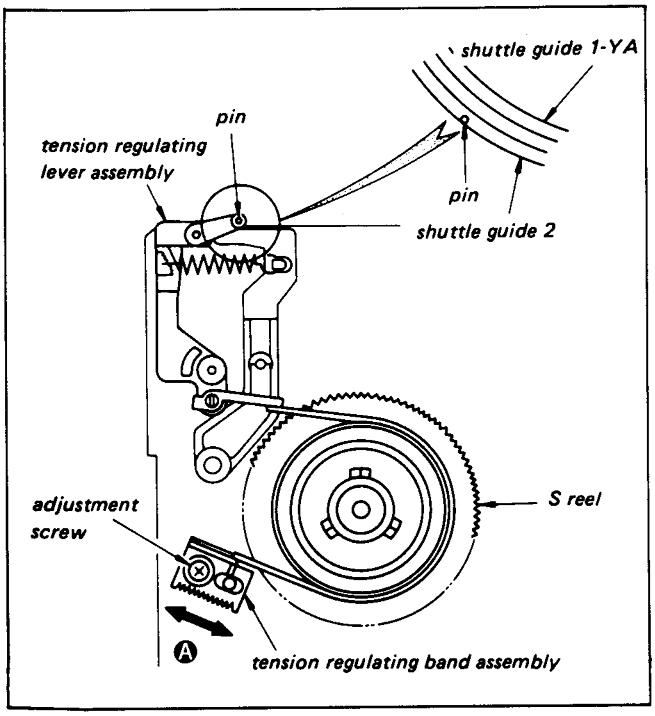

shuttle guide 1-YA
pin
tension regulating lever assembly
pin
shuttle guide 2
adjustment screw
S reel
Ⓐ
tension regulating band assembly

Fig. 3-34 Adjustment of the position of the tension regulating lever

3-16. ADJUSTMENT OF THE FORWARD BACK TENSION

[Method of measurement]

1) Insert the torque cassette (SL-0003C) and put the unit in playback mode.
2) Read the value on the meter on the S reel side after the needle has gone around about once.
   The correct value is 31 g·cm – 35 g·cm

Notes:

i) The set must be perfectly level during this measurement.

ii) After the measurement, the tape can become slack when the stop button is pressed. If this happens set the unit is forward mode to take up the slack before removing the tape.

[Method of adjustment]

Move the position of the tension coil spring that is hooked on the tension regulating lever assembly in the direction of arrow Ⓐ unit the measured value falls within the correct range.

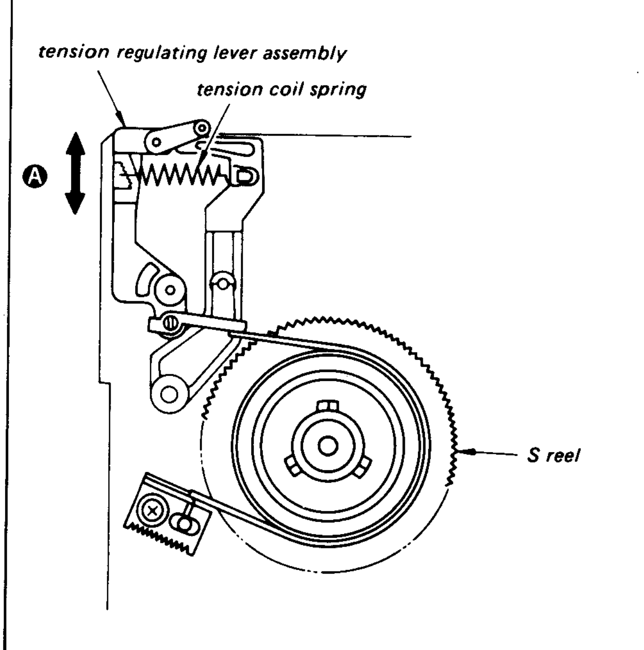


Fig. 3-35 Adjustment of the back tension

3-17. ADJUSTMENT OF THE FORWARD TORQUE

[Method of measurement]

1) Insert the torque cassette (SL-0003C) and start to record a telecast.
2) Read the value on the meter on the T reel side after the needle has gone around about once. The correct range is 80 g·cm ±5 g·cm.

[Method of adjustment]

1) Remove the front panel.
2) Turn potentiometer RV309 on SA-9 board to adjust the torque until its value falls within the correct range.

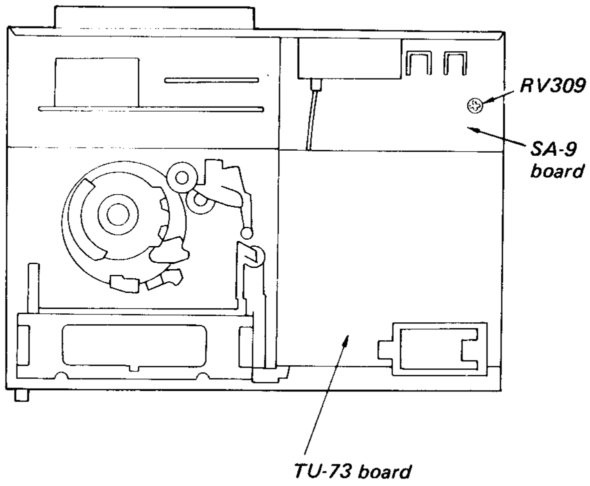


Fig. 3-36 Adjustment of the forward torque

Note:

When the forward torque is weakened during the measurement the tape can become slack, in which case the set will go into emergency stop mode. In such a case, the only switches that will work are the cassette eject switch and the power switch. It is necessary to temporarily remove the cassette, or to turn the power OFF and back ON.

4 TAPE PATH ADJUSTMENT

4-1. TRACKING ADJUSTMENT

This adjustment has significant effect on picture quality in each mode and tape interchangeability, so please perform it very carefully.

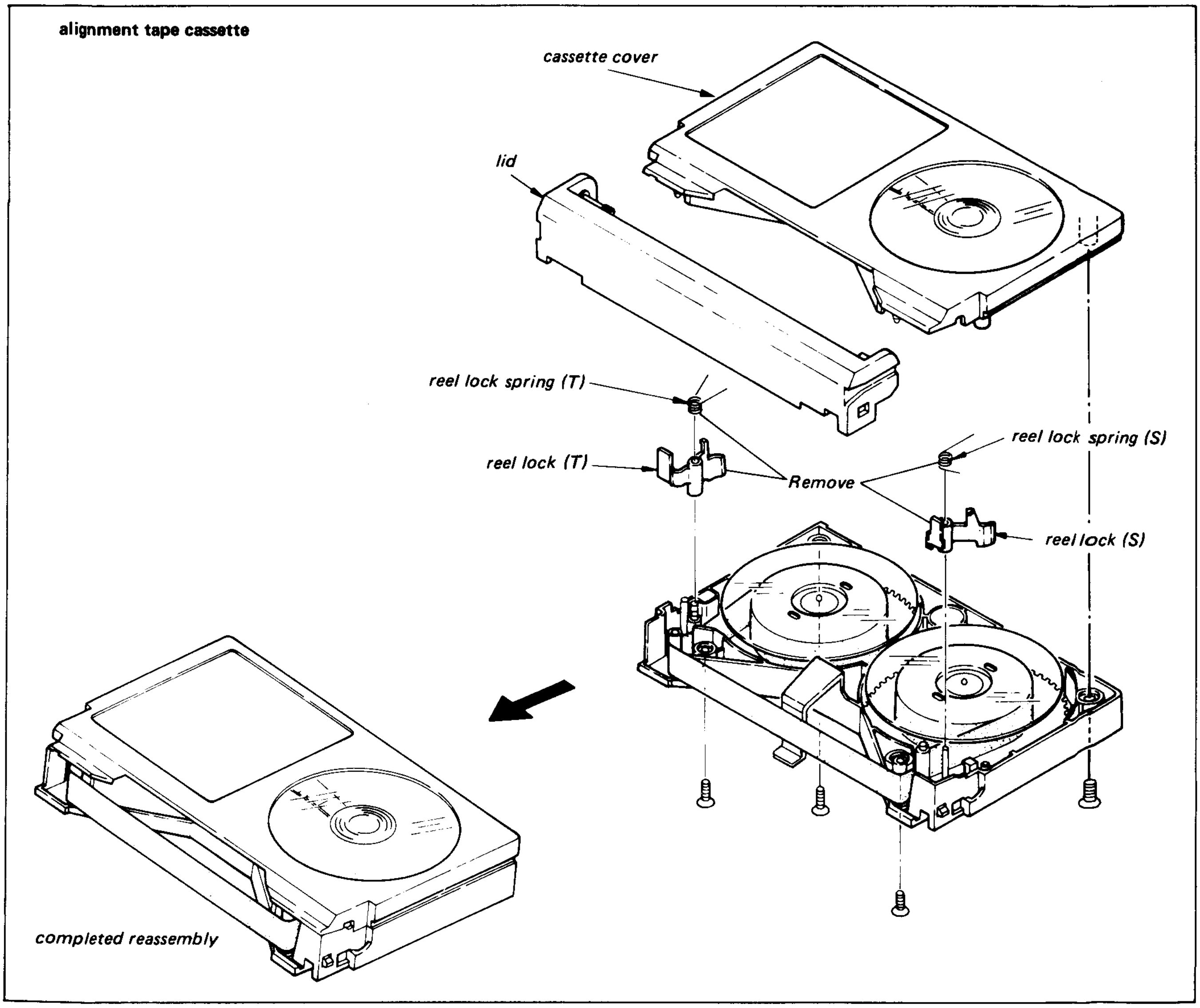
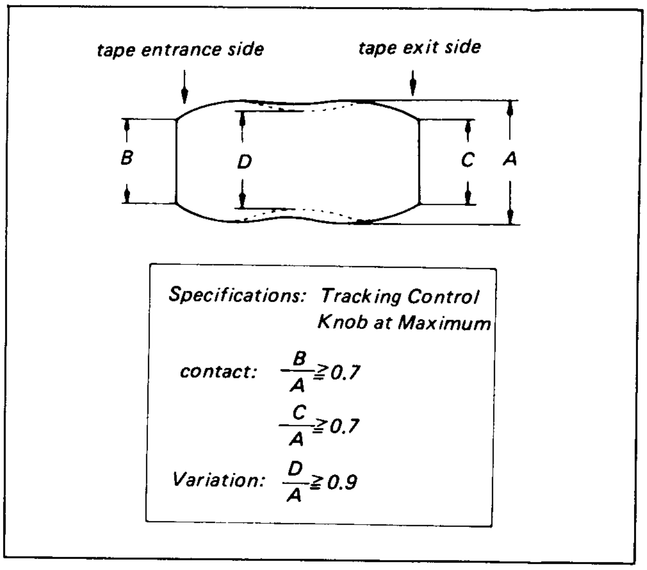

alignment tape cassette
cassette cover
lid
reel lock spring (T)
reel lock (T)
Remove
reel lock spring (S)
reel lock (S)
completed reassembly

Fig. 4-1 Cassette Holder Remodeling

4-1-1. Preparation

1) When modifying alignment tape KR5-2H, use caution not to dislodge the tape reels from their correct position. Refer to Fig. 4-1 and remove the four screws that secure the upper cover to the lower cover.
   Remove the upper cover and lid. Separate the lid and lid tension spring from the upper cover. Remove the two reel lock springs (T and S) and the two reel locks (T and S). Remount only the upper cover, being certain that it is properly mated with the lower cover. Secure the covers with four screws. NOTE — If the reel locks, and related springs are not removed from the cassette, the tape will load but will not thread. In this case the cassette will be ejected from the VTR approximately eight seconds after being loaded into the VTR.
2) Clean the tape contact surfaces (tape guides, drum, capstan shaft, pinch roller, ACE FE head surface) with chamois dampened with methanol.
3) Oscilloscope connections:
   1ch: CN702-5 pin (RY-4 board)
   2ch: CN702-3 pin (RY-4 board)
4) Play back the tracking portion of the modified alignment tape.
5) Confirm that the RF output waveform is flat, with maximum amplitude. (The waveform should increase and decrease, remaining flat, when the tracking control knob is turned back and forth.) Also, when the waveform is maximum, confirm that the RF output waveform variation and contact satisfy the specifications shown in Fig. 4-2. If they do not, follow the instructions in 6).
6) If the tracking control knob is turned and the entrance waveform does not flatten as shown in Fig. 4-3(a), perform the entrance side adjustment in 4-1-2. If the exit waveform does not flatten as shown in Fig. 4-3(b), perform the exit side adjustment in 4-1-3.


tape entrance side
tape exit side
B
D
C
A

Specifications: Tracking Control Knob at Maximum

contact: $\frac{B}{A} \geqq 0.7$

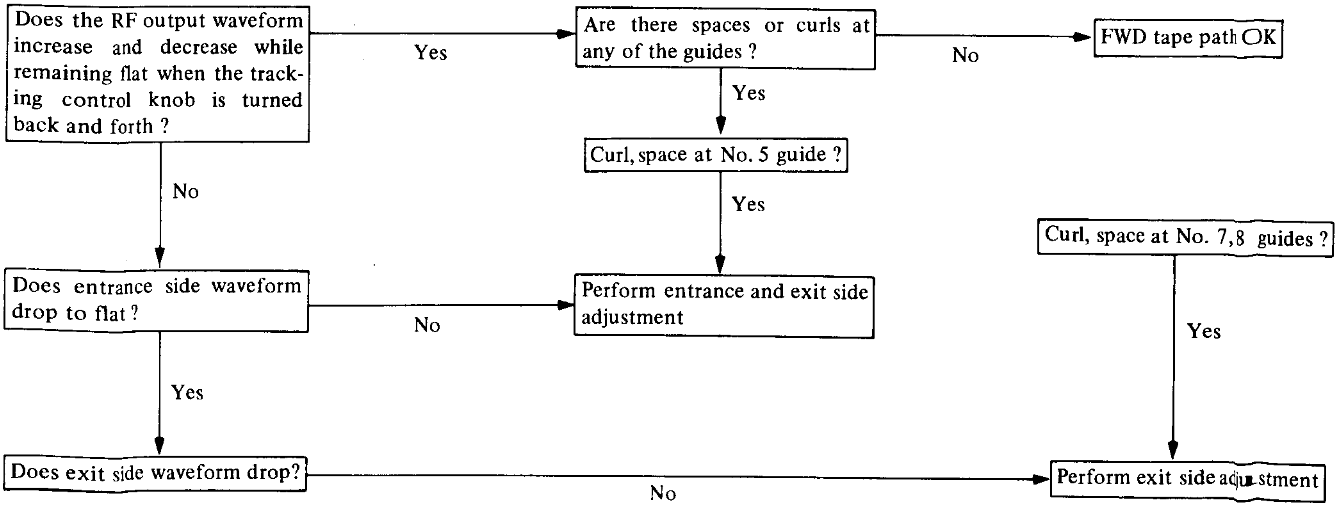
$\frac{C}{A} \geqq 0.7$

Variation: $\frac{D}{A} \geqq 0.9$

Fig. 4-2

	BOARD	CONNECTOR & PIN NO.
RF Output Waveform	RY-4	CN702-5
External Trigger	RY-4	CN702-3
Audio Out	SA-9	CN501-1
Video Out	AF-7	VIDEO OUT

Waveform Confirmation


Does the RF output waveform increase and decrease while remaining flat when the tracking control knob is turned back and forth ?
Yes
Are there spaces or curls at any of the guides ?
No
FWD tape path OK
Yes
Curl, space at No. 5 guide ?
Yes
No
Curl, space at No. 7,8 guides ?
Does entrance side waveform drop to flat ?
No
Perform entrance and exit side adjustment
Yes
Yes
Does exit side waveform drop?
No
Perform exit side adjustment

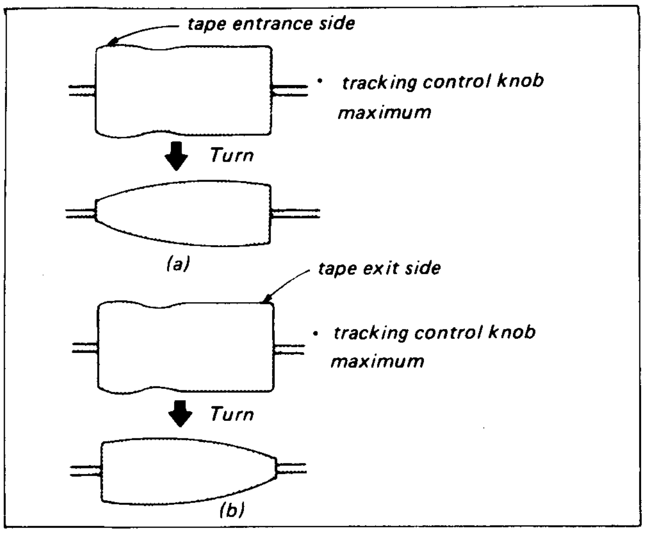

tape entrance side
• tracking control knob maximum
Turn
(a)
tape exit side
• tracking control knob maximum
Turn
(b)

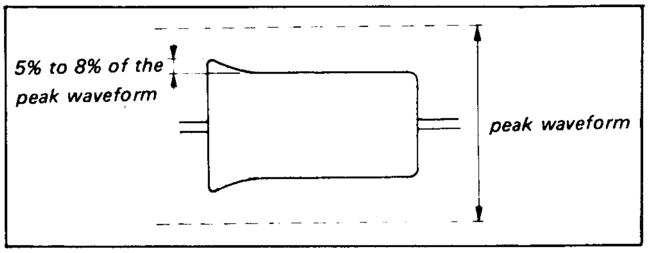
Fig. 4-3

Note:
After the indicated tape path adjustments that follow have been successfully completed using normal playback speed, operate the VTR in the Speed Search mode and look for curl at the tape guides. Readjust them if necessary. Then finally, playback a regulator L830 tape as a check-up. See Section 4-4.

4-1-2. Entrance Side Adjustment

Always perform the exit side adjustment as well as the entrance side adjustment, Fig. 4-4 illustrates the guides and adjustment locations.

1) Turn tracking control knob counterclockwise to drop RF output waveform to about 60% of maximum
2) Turn No. 6 guide counterclockwise to free tape transportation to the drum. Use a special notched screw driver. (See section 1-8. Tools and Fixtures Required.)
3) Loosen No. 5 guide lock screw ❶, turn No. 5 guide so that the entrance side waveform is almost flat, as shown in the figure below, and tighten lock screw ❶. (See Fig. 4-5)

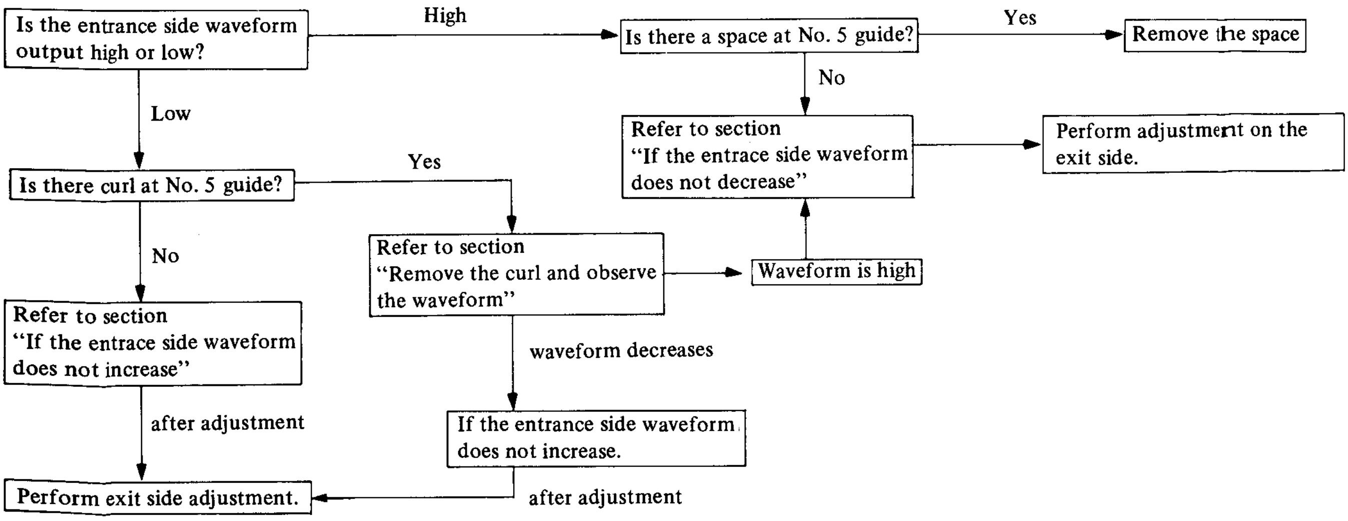

5% to 8% of the peak waveform
peak waveform

Note:
Be sure that the waveform remains as shown in the figure after tightening the lock screw ❶.

4) Next lower No. 6 guide and flatten the waveform.
5) Push the tape down between No. 4 and No. 5 guides by hand, and confirm that the entrance side RF waveform returns to the original state after being lowered. If the waveform is not as illustrated, or if the waveform does not flatten, or takes too much time to flatten after the entrance side tape is pushed down, follow the procedure below to adjust.
6) Check No. 5 guide for space and curl. If space or curl exists, follow the appropriate adjustment procedure.

Note:
Be sure that there is tape tension upper and lower balance between No. 3 – No. 4 – No. 5 guides. Perform No. 3 or No. 5 guide lateral adjustment if necessary.

Entrance Side Flow Chart


Is the entrance side waveform output high or low?
High
Is there a space at No. 5 guide?
Yes
Remove the space
No
Refer to section "If the entrace side waveform does not decrease"
Perform adjustment on the exit side.
Low
Is there curl at No. 5 guide?
Yes
Refer to section "Remove the curl and observe the waveform"
Waveform is high
No
Refer to section "If the entrace side waveform does not increase"
waveform decreases
after adjustment
If the entrance side waveform does not increase.
Perform exit side adjustment.
after adjustment

Note:

Upon failing to obtain the waveforms shown above, press down the tape at the entrance side, adjust as indicated below when a long time is needed for the waveform to return to the horizontal, or when it does not return at all.

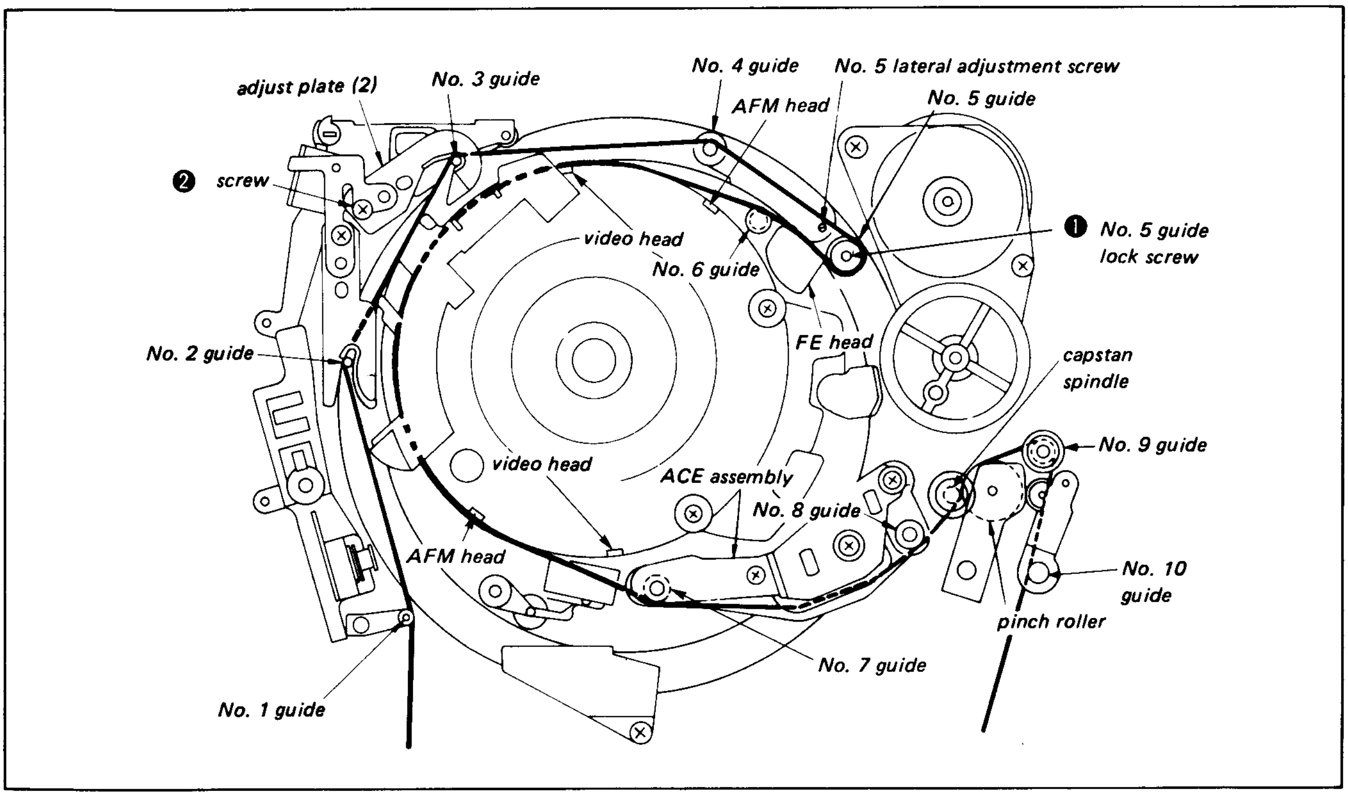

adjust plate (2)
No. 3 guide
No. 4 guide
No. 5 lateral adjustment screw
AFM head
No. 5 guide
❷ screw
video head
No. 6 guide
❶ No. 5 guide lock screw
No. 2 guide
FE head
capstan spindle
No. 9 guide
video head
ACE assembly
No. 8 guide
AFM head
No. 10 guide
pinch roller
No. 7 guide
No. 1 guide

Fig. 4-4 Tape Guide Layout

[If the waveform entrance output does not increase]

1) Check to make sure tape upper and lower tension is equal between No. 3 — No. 4 — No. 5 guides. If it is not, perform No. 3 or No. 5 guide lateral adjustment.

   Note:

   Be sure there is no space at No. 4 guide lower flange.

2) Raise No. 4 guide lower flange to raise entrance output.

   Note:

   No. 4 guide lower flange may be raised 0.4 mm from its lowest position.

3) If the waveform does not increase in step 2), turn No. 5 lateral adjustment screw slightly (less then 360°) counterclockwise.

[If the waveform entrance output does not decrease]

1) Move the No. 3 guide adjust plate away from the drum, and tighten screw ❷ at the point just before the lower tension of the tape loosens.
2) If the tape is touching No. 4 guide lower flange, lower the flange. If it is floating, adjust No. 5 guide laterally.

[If there is space at No. 5 guide]

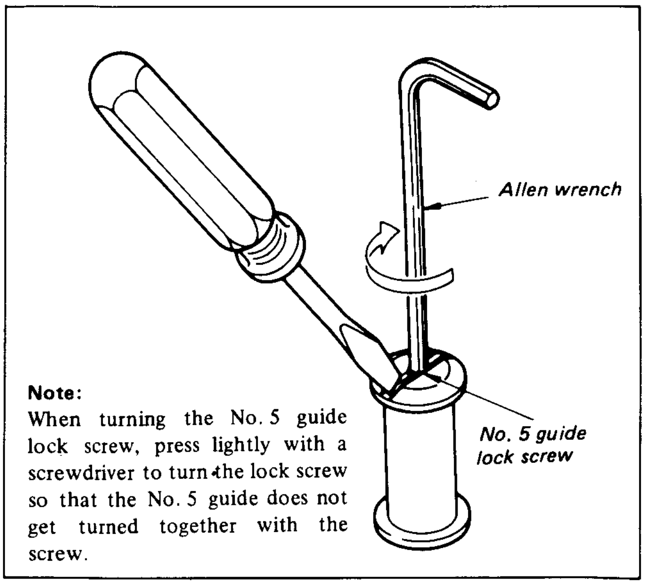
Turn No. 4 guide conterclockwise to raise the tape and remove the space at No. 5 guide.

Note:

Be careful not to create a large space at the bottom of No. 4 guide.

[If there is curl]

1) When there is a space at the bottom of No. 4 guide: Lean the adjust plate of No. 3 guide toward the outside until the point just before the lower tape tension loosens.
2) When there is curl but no space at the bottom of No. 4 guide:
   - i) Confirm that No. 4 guide is not raised too high. Turn clockwise to lower if necessary.
   - ii) If this does not slove the problem, tighten No. 5 guide lateral adjustment screw by turning clockwise until the curl disappears.



Note:
When turning the No. 5 guide lock screw, press lightly with a screwdriver to turn the lock screw so that the No. 5 guide does not get turned together with the screw.

Fig. 4-5

4-1-3. Exit Side Adjustment

1) Turn the tracking control knob counterclockwise to lower the RF output waveform to about 60% of the maximum.
2) Raise No. 7, 8 guides to free the tape transportation, and check the waveform. (This waveform is called "exit free waveform".)

Note:

Be careful not to raise the guides too much. They should be raised about 0.3 mm, and also, the tape should not touch the ACE head bottom flange. (Fig. 4-6)

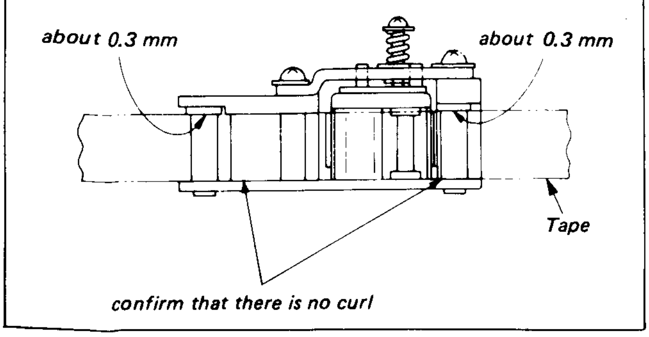
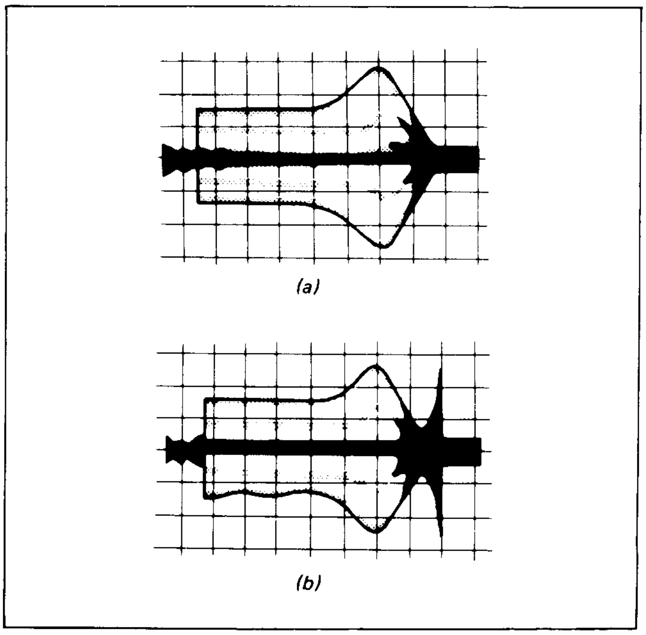


Fig. 4-6

i) If the exit free waveform is within the range illustrated in Fig. 4-7(a), (b), proceed with exit side adjustment.
ii) If it is not within the specified range, follow the adjustment procedure in 4-3.



(a)

(b)

Fig. 4-7

3) Flatten the waveform with No. 7 guide, and match No. 8 guide to the tape. (Lower the guide to the point just before the waveform changes, and where there is no curl.) At this time, the exit side waveform may rise slightly, so lower No. 7 guide again to flatten it, and match No. 8 guide to the tape.
4) Confirm that there is no curl at No. 7, 8 guides in forward mode.
5) Confrim that curl and space do not appear at No. 8 guide in reverse mode. If curl or space appears, adjust with No. 9 guide.

4-2. ADJUSTMENT AFTER REPLACEMENT OF THE ACE ASSEMBLY

Perform the following adjustments after removing or replacing the ACE assembly.

4-2-1. Tracking Adjustment

1) Position the parallel plate (Fixture, SL-0657) at shown in Fig. 4-8, and turn audio head lateral adjustment screw ❶ to adjust the audio head vertically.

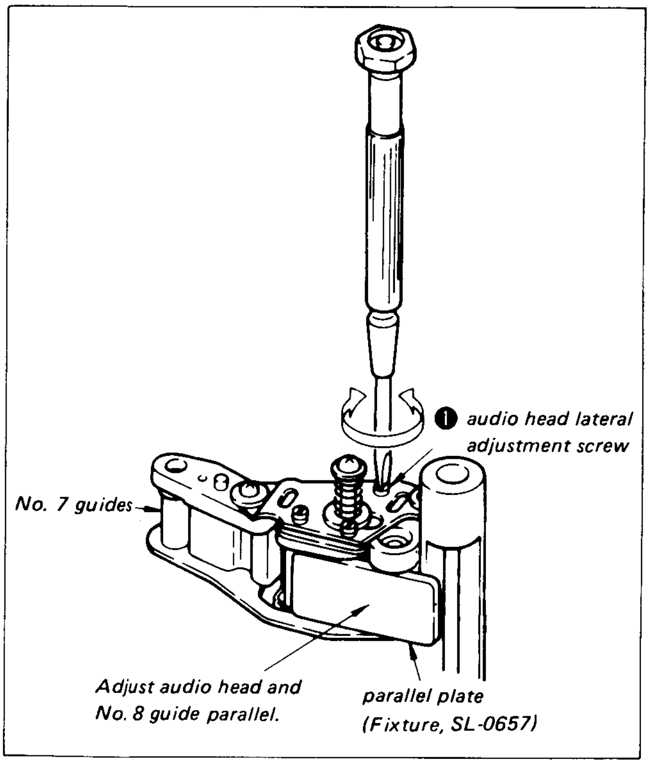

❶ audio head lateral adjustment screw
No. 7 guides
Adjust audio head and No. 8 guide parallel.
parallel plate (Fixture, SL-0657)

Fig. 4-8

2) Turn the tracking control knob counterclockwise to lower the RF output waveform to about 60% of the maximum.
3) Play back the tracking portion of the alignment tape raise No. 7, 8 guides about 0.3mm and check the exit free waveform of the RF output waveform.

Note:

Be sure that the tape does not touch the bottom flange of the ACE assembly.

   i) If the waveform is within the range illustrated in Fig. 4-7(a), (b), proceed with the adjustment.
   ii) If the exit free waveform appears as shown in Fig. 4-9, turn the ACE lateral adjustment screw clockwise until the waveform is within the range illustrated in Fig. 4-7(a), (b).
   iii) If the exit free waveform appears as shown in Fig. 4-10, turn the ACE lateral adjustment screw counterclockwise to obtain the waveform shown in Fig. 4-9, then turn clockwise again until the waveform is within the range shown in Fig. 4-7.

4) Turn the No. 7 guide to flatten the waveform, and match the No. 8 guide to the tape. (Lower the guide until the point just before curl appears at No. 8 guide flange.)
5) If the RF output waveform is as shown in Fig. 4-9, where the exit side is not flat, lower No. 7, No. 8 guides again to flatten it.

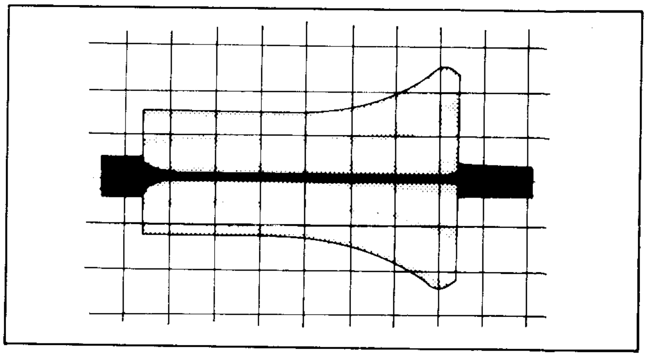


Fig. 4-9

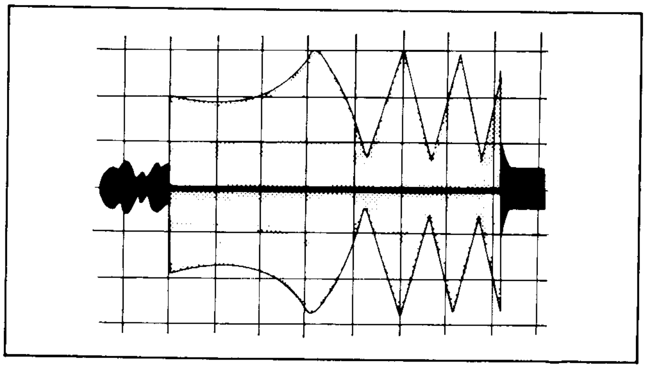


Fig. 4-10

4-2-2. Audio Head (ACE Assembly) Azimuth Adjustment

1) Connect the oscilloscope as follows:
   CN501 ..... 1 pin (SA-9 board)
   Play back the 5 kHz portion of the alignment tape.
2) Turn the azimuth adjustment screw (Fig. 4-11) so that the amplitude of the 5 kHz waveform is maximum.

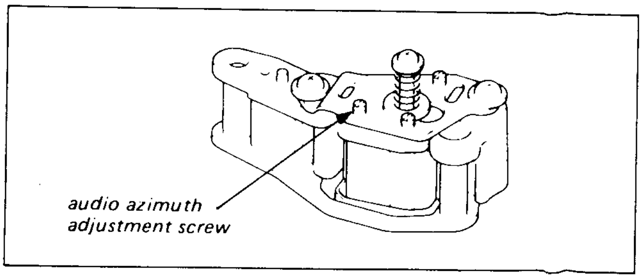


Fig. 4-11

4-2-3. CTL Head (ACE Assembly) Position Adjustment

This adjustment is both mechanical and electric: mechanically, it is the adjustment of the CTL head position, and electrically, it is the tracking control center adjustment. The procedure involves performing the electrical adjustment first, then the head position adjustment.

1) Connect the oscilloscope as follows:
   1ch: CN702 .... 5 pin (RY-4 board)
   2ch: CN501 .... 1 pin (SA-9 board)
   External trigger: CN702 .... 3 pin (RY-4 board)
2) Play back the tracking portion of the alignment tape.
3) Turn the tracking control knob back and forth, and confirm that the output waveform level is maximum at the center click position, and that the 0 level of the audio signal is at the point where the RF output waveform Bch waveform appears, as shown in Fig. 4-12.
   If adjustment is necessary, proceed as follows.

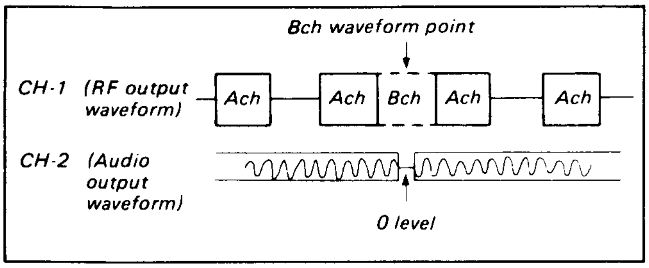


Fig. 4-12

4) Tracking Control Center Adjustment
5) CTL Head Position Adjustment
   Set the tracking control knob at the center detent position and loosen the two ACE assembly position adjustment screws ①. As shown in Fig. 4-13 slide the ACE assembly with a screwdriver until it is in the position shown in Fig. 4-12 and the RF output waveform is maximum. Tighten the screws ① when this position is obtained.
6) Replay the color bars of the alignment tape and check the picture quality.

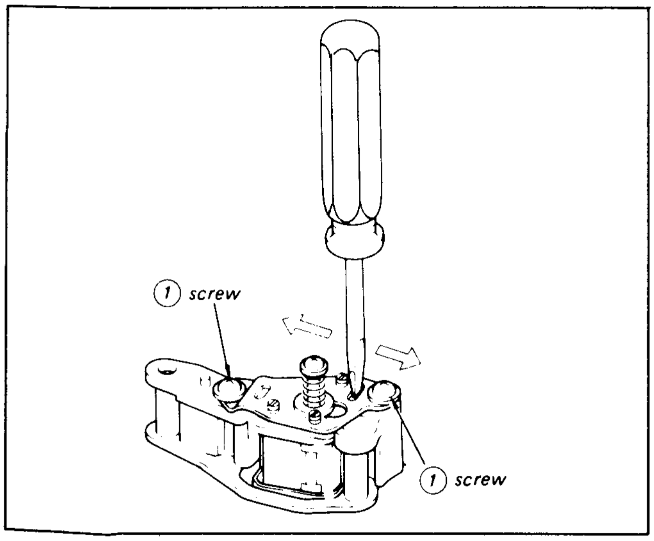


Fig. 4-13

4-2-4. Audio Head (ACE Assembly) Height Adjustment

Perform this adjustment only after completing the exit side tracking adjustment.

1) Oscilloscope connection:
   1ch: CN501 .... 1 pin (SA-9 board)
   Replay the 5 kHz portion of the alignment tape.
2) Turn the audio head height adjustment screw ① and the lateral adjustment screw ② (Fig. 4-14) until the audio output waveform amplitude is maximum.

Note:

Both of these adjustment screws should be turned in the same direction at the same angle, less then 30°.

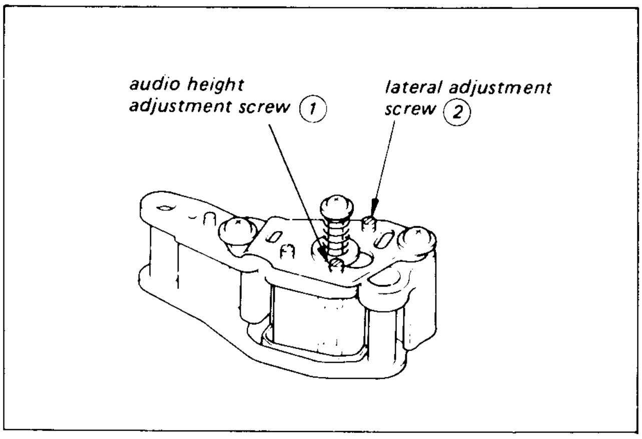
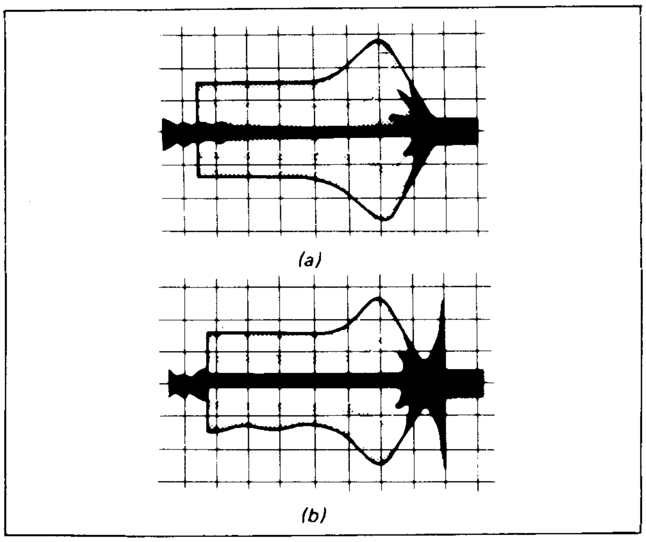


Fig. 4-14

4-3. ADJUSTMENT AFTER REPLACEMENT OF THE CAPSTAN MOTOR

1) Perform the vertical adjustment of the capstan shaft according to 3-6. Replacement and Adjustment of Capstan Motor.
2) Play back the tracking portion of the alignment tape.
   Connect the oscilloscope as follows:
   1ch: CN702 .... 5 pin (RY-4 board)
   2ch: CN702 .... 3 pin (RY-4 board)
3) Turn the tracking control knob clockwise to lower the RF output waveform to about 60% of the maximum.
4) Raise No. 7, 8 guides a little, and check the exit free waveform.
   i) If the exit free waveform is within the range indicated in Fig. 4-15(a), (b), proceed from step 5).


(a)

(b)

Fig. 4-15

   ii) If the peak of the exit free waveform is smaller than that illustrated in Fig. 4-15(a) (e.g. Fig. 4-16), loosen the lock screw, then turn the capstan adjustment screw until the waveform is within the specified range.

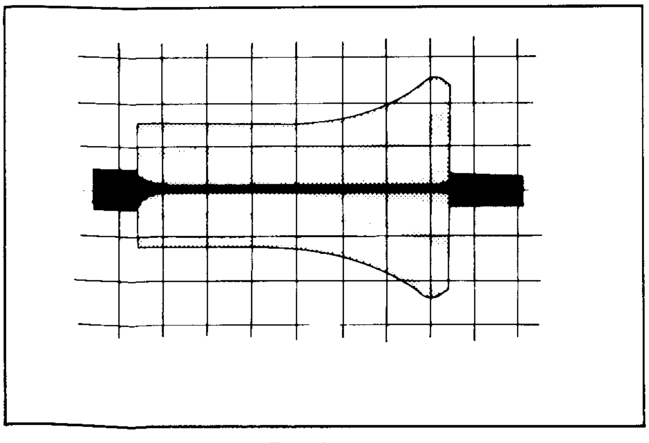


Fig. 4-16

   iii) If the peak shape of the exit free waveform differs from that shown in Fig. 4-15(b) (e.g. Fig. 4-17), loosen the lock screw, then turn the capstan adjustment screw clockwise until the waveform is within the specified range.

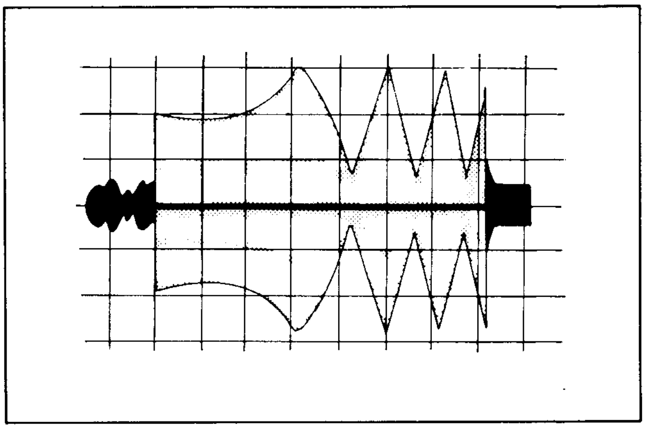


Fig. 4-17

Note:
After turning the capstan adjustment screw wait until the waveform stabilized (about 10 – 15 seconds) before continuing with the adjustment.

5) Lock the capstan lock screw. (Turn clockwise until is stops, then turn about 30° more. At this point, the exit free waveform will change slightly, and if it goes out of the range shown in Fig. 4-15(a), (b) return to step 4) and re-adjust.
6) Flatten the waveform with No. 7 guide, and match No. 8 guide to the tape. If the exit waveform rises, flatten it again with No. 7 guide and match No. 8 guide to the tape again.
7) Confirm and adjust according to 4-1-3, exit side adjustment procedure items 4), 5).

Note:
Check with L830 tape.

4-4. THIN TAPE MOVEMENT CHECK METHOD DURING TAPE PATH ADJUSTMENT

After confirming the tape path by using the procedures of section 4-1 through 4-3, check the thin tape movement by the procedure given below.

1) Prepare one reel of the commercial L-830. Remove the cassette lid with reference to Fig. 4-1.

2) Run L-830 prepared in the procedure 1 in the PLAY mode and check the following points;

   i) Entrance Side
   Check if the tape bends and is damaged on the No. 4 guide bottom flange, the No. 5 guide top flange and the No. 6 guide top flange. (The curl of the tape is allowed), but the bend of the tape is not allowed.) (Fig. 4-18)

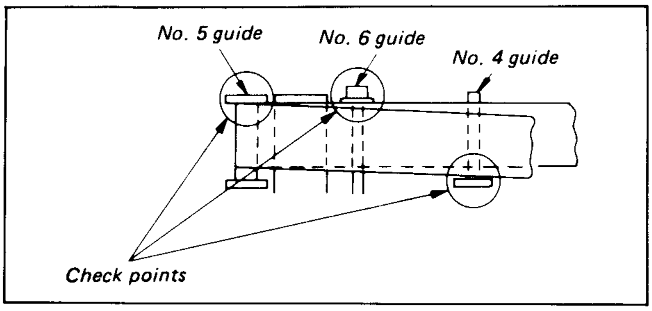


Fig. 4-18

   ii) Exit side
   Check if the tape bends and is damaged on the No. 7 guide top flange, the No. 8 guide top flange and the No. 10 guide top and bottom flanges. (The curl of the tape is allowed, but the bend of the tape is not allowed.) (Fig. 4-19)

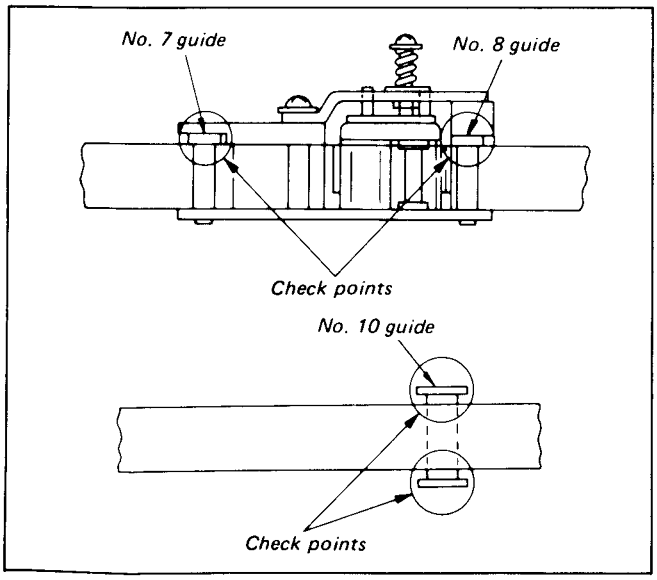


Fig. 4-19

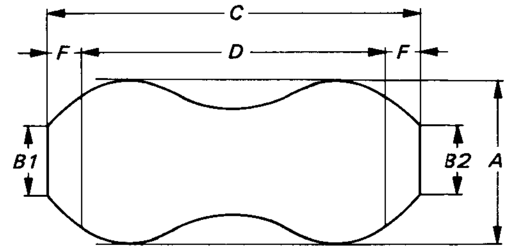
3) If the tape did not run normally in step 2, readjust the tape path by using.

   a) The tape did not run normally on the entrance side, refer to 4-1-2.

   b) The tape did not run normally on the exit side, refer to 4-1-3.

4-5. BETA HI-FI RF OUTPUT WAVEFORM CHECK

1) Set the BETA HI-FI RECORD button inside the front door to the SOUND side.
2) Set both REC slide knobs L and R of the REC level meter to "0".
3) Record in a no-signal state.
4) Play back the recorded part and check that the RF output satisfies the conditions described in Fig. 4-20. (Operate this procedure for both Ach and Bch)



$B1 \geqq 0.8A$
$B2 \geqq 0.8A$
The output of the range D
shall be more than 0.85A
(provided $D \geqq 0.8C$, $F \leqq 0.1C$)

Note: Tracking control knob is at the center click position.

Fig. 4-20

	BOARD	CONNECTOR, TP & PIN No.
RF Output Waveform (Ach)	AF-7	CN008-1P
RF Output Waveform (Bch)	AF-7	CN008-2P
External Trigger	AF-7	CN008-4P

SECTION 5
ELECTRICAL ALIGNMENT

All the electrical alignment can be performed by using the equipment mentioned below, the alignment tape, and the PAL colour bar signal (100%).

[Equipment Required]

(1) PAL Colour Monitor TV
(2) Oscilloscope, Dual-trace, Bandwidth... more than 10 MHz with delay mode
(3) Frequency Counter
(4) PAL Colour-Bar Generator
(5) Digital voltmeter
(6) VOM (20 kΩ/V)
(7) Audio Signal Generator
(8) Audio level meter (VTVM)
(9) Attenuator
(10) Spectrum analyzer
(11) Alignment Tape, type: KR5-2H, Code No. 8-969-995-52
KR5-10C, Code No. 8-192-508-01
(12) Alignment Tool (Adjusting screwdriver for semi-fixed resistors and coils)
Jig No. SL-0001, Code No. J-6080-001-A

[Setup for Alignment]

The antenna should be connected correctly to the antenna input terminal of the videocassette recorder.

It is important that the video output signal satisfies the specification because the telecast signal received by the incorporated tuner of the videocassette recorder is utilized as the adjustment signal of the machine. The incorporated tuner should be set to the channel with the best reception. The video signal should be checked with an oscilloscope connected to VIDEO OUT (BNC connector). Verify that the sync signal amplitude is approx. 0.3 Vp-p and the video signal amplitude is approx. 0.7 Vp-p at peak. Adjust the fine tuning while observing the signal and the TV screen so that the burst signal amplitude becomes approx. 0.3V ± 0.1 Vp-p. Also confirm that there is not spikes observed at the sync signal portion. (See Fig. 5-1.)

The video (colour bar) signal for the alignment is shown in Fig. 5-1.

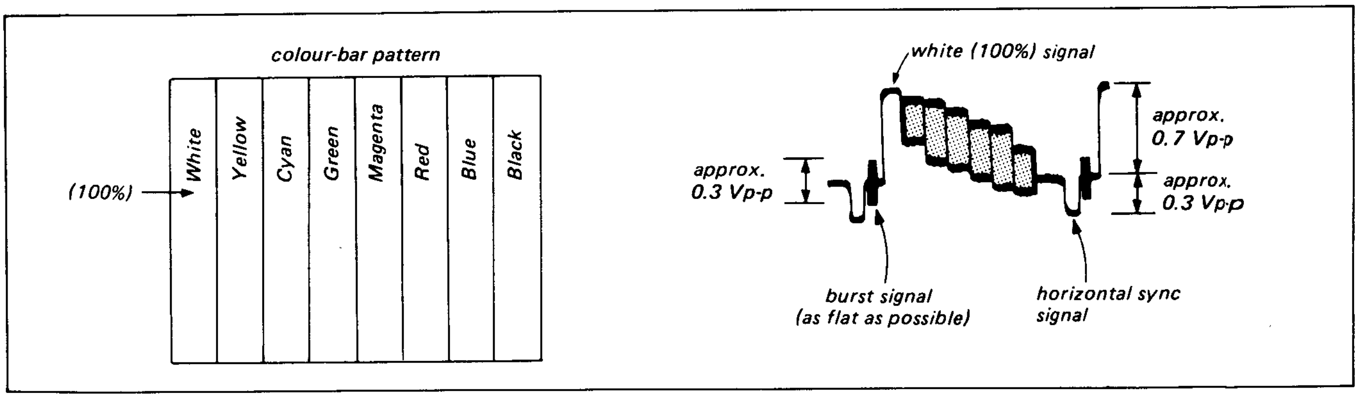


Fig. 5-1. Video (colour-bar) signal

[Alignment Tape]
KR5-2H

	Video signal	Audio signal	Playing time	Use for
1.	Colour-bars	3 kHz – 5 dB	5 min	General performance, tape speed checks, switching position adjustment.
2.	Monoscope	333 Hz – 25 dB	5 min	Video head dihedral, audio level adjustment.
3.	RF sweep	5 kHz – 25 dB	5 min	Video, audio frequency characteristics, audio azimuth adjustment. marker: 1, 2, 3.58, 4.5, 5.2 MHz
4.	Tracking 1 MHz (CH-B) *1 (Channel B is inserted in every 3 frames.)	1 kHz – 5 dB *2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check. (Check if *1 and *2 are the same position.)

KR5-10C (Beta hi-fi Audio)

	Video signal	Audio signal	Playing time	Use for
	Colour-bars	Beta hi-hi 400 Hz ±66.7 kHz DEV	30 min	Beta hi-fi Audio level, balance adjustment.

[Alignment Tool for Semi-fixed Variable Resistors and Coils]

Semi-fixed variable resistors and inductances should be adjusted with the alignment tool exclusively prepared for the adjustment of the components. A common screwdriver is too large for adjusting the components from the conductor side of a printed circuit board.

The metal blade of the alignment tool is used for variable resistors and trimmer capacitors and the plastic tip is used for variable inductances.

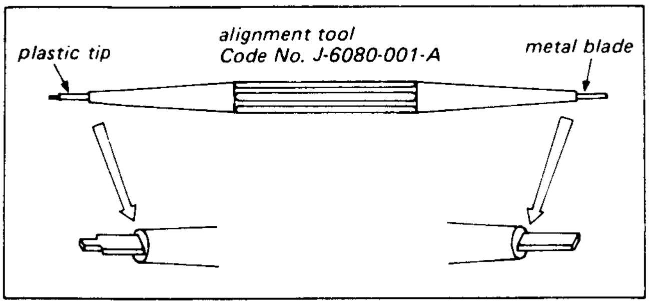

plastic tip
alignment tool
Code No. J-6080-001-A
metal blade

Fig. 5-2. Alignment tool

[Required levels and Impedances of Input and Output]

Video

Input VIDEO IN: BNC connector
$1.0\ \mathrm{V}^{+1.0}_{-0.5}\ \mathrm{V}$ (p-p)
75 ohms, unbalanced,
sync negative
Output VIDEO OUT: BNC connector
1.0 V (p-p) ±0.1 V (p-p)
75 ohms, unbalanced,
sync negative

Audio

Input AUDIO IN: phono jacks
47 kilohms, −10 dBs
(0 dBs = 0.775 V rms)
Outputs AUDIO OUT: phono jacks
Load impedance less than
10 kilohms
−10 dBs with 47 kilohms load,
unbalanced
PHONES: stereo minijack
−26 dBs, 8 ohms

[Colour-Bar Signal]

The 100% colour-bar signal recorded on the Alignment tape is shown in Fig. 5-3.

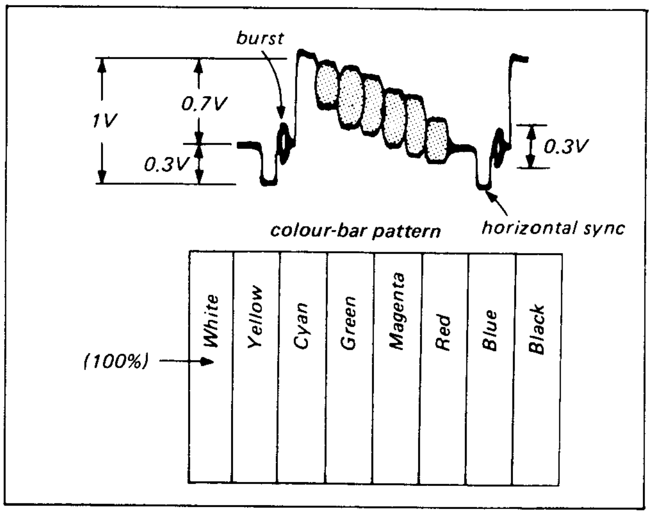
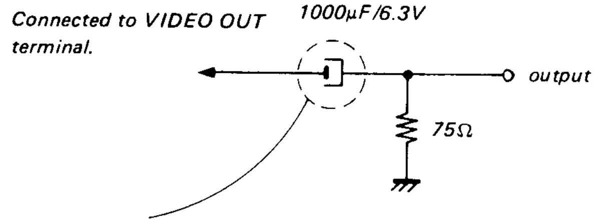

burst
1V
0.7V
0.3V
0.3V
colour-bar pattern
horizontal sync
(100%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
Black

Fig. 5-3. Colour-bar signal recorded on the alignment tape

[75 Ω Terminating Method]

To terminate the video output terminal follow the steps shown in Fig. 5-4.

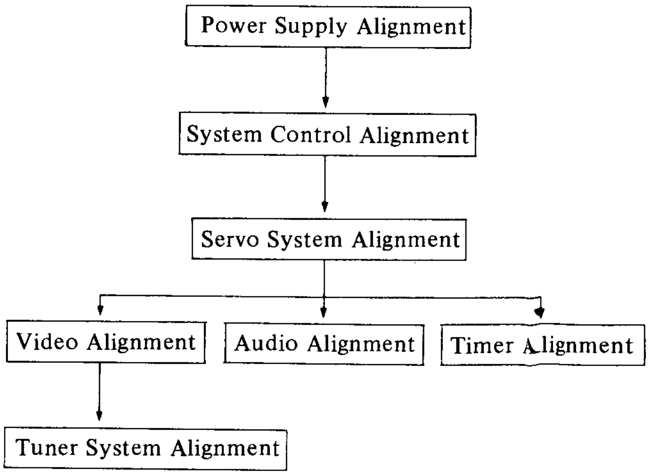

Connected to VIDEO OUT terminal.
1000μF/6.3V
output
75Ω

Note: *The machine may be damaged if it is terminated in 75Ω before cutting the DC component.*

Fig. 5-4. 75Ω terminating circuit

[Adjustment procedure]

Adjust in the order given below.


Power Supply Alignment
System Control Alignment
Servo System Alignment
Video Alignment
Audio Alignment
Timer Alignment
Tuner System Alignment

5-1. POWER SUPPLY CHECK (SA-9 Board)

Measure an E-E mode (power supply switch ON).

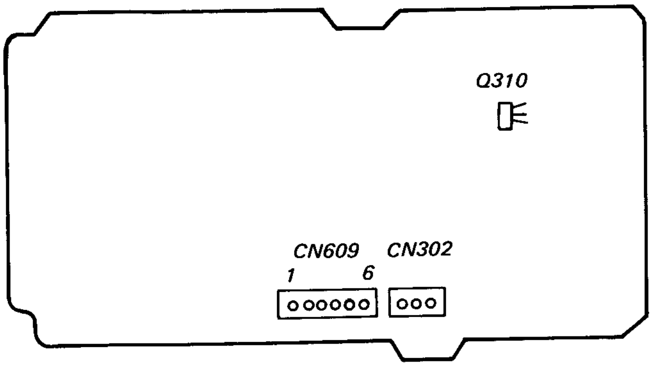

Q310
CN609
1
6
CN302

Fig. 5-5. Conductor layout

1. Switched 12 V Check
   Pin ③ of CN609 shall be 12.0 ±0.3 V.
2. Switched 9 V Check
   Pin ⑤ of CN609 shall be 9.0 ±0.1 V.
3. Unswitched 5 V Check
   Pin ① of CN609 shall be 5 ±0.1 V.
4. Unswitched 10 V Check
   Pin ⑥ of CN609 shall be −10 ±1 V.
5. Unswitched 5 V Check
   Emitter of Q310 shall be 5 ±0.2 V.

5-2. SYSTEM CONTROL CHECK (SA-9 Board)

1. Clock Frequency Check

Mode: E-E
Signal: None
Frequency counter: Pin (62) of IC601
Check: f: 6.0 MHz ±0.12 MHz

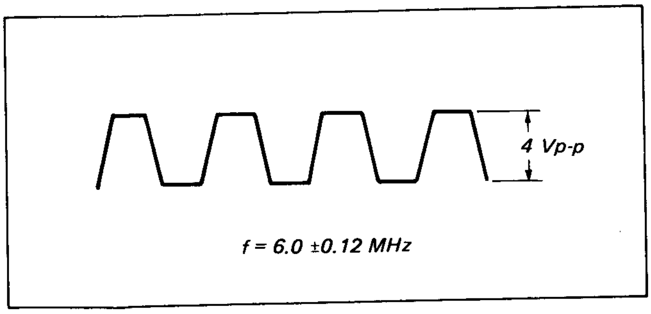

4 Vp-p
f = 6.0 ±0.12 MHz

Fig. 5-6. Clock frequency check

5-3. SERVO SYSTEM ALIGNMENT

Alignment Sequence

1. Drum servo system alignment
2. Capstan servo system alignment

5-3-1. Drum Servo System Alignment

1) Drum DC Bias Adjustment (SA-9 Board)
   Mode: REC
   Oscilloscope: TP306 (Emitter of Q335)

[Alignment method]
Adjust to 1.8 V ±0.1 V with RV305. (See Fig. 5-7.)

2) LOCK Phase Adjustment (SA-9 Board)
   Mode: REC
   Oscilloscope: CH-1 TP303 (Pin ㊽ of IC301)
   CH-2 TP304 (Pin ㉟ of IC301)

[Alignment method]
Adjust to T=500 ±30 μsec with RV303. (See Fig. 5-7.)

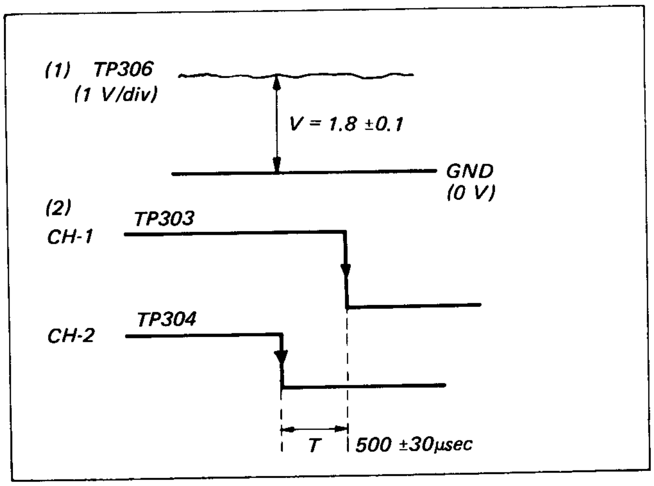

(1) TP306
(1 V/div)
V = 1.8 ±0.1
GND
(0 V)
(2)
CH-1
TP303
CH-2
TP304
T
500 ±30μsec

Fig. 5-7. Drum DC bias adjustment

3) RF Switching Position Adjustment (SA-9 Board)
   Mode: Playback
   Signal: Alignment tape colour-bar or monoscope
   Oscilloscope: CH-1 TP304 (Pin ㉞ of IC301)
   CH-2 Pin ① of CN301

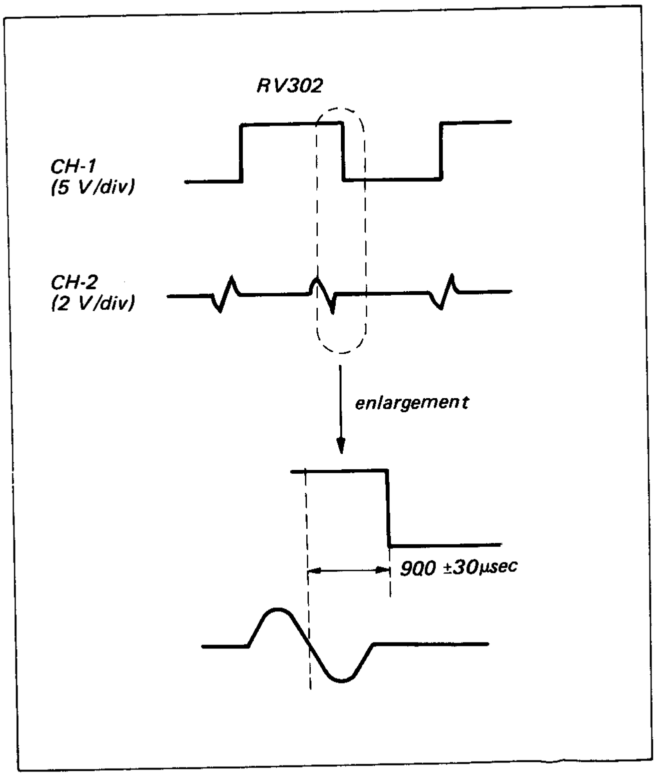

RV302
CH-1
(5 V/div)
CH-2
(2 V/div)
enlargement
900 ±30μsec

Fig. 5-8. RF switching position adjustment (1)

[Adjustment method]

i) Adjust to 900 µsec ±30 µsec with RV302. (See Fig. 5-8.)

ii) Adjust to 900 µsec ±30 µsec with RV301 at the rising edge. (See Fig. 5-9.)

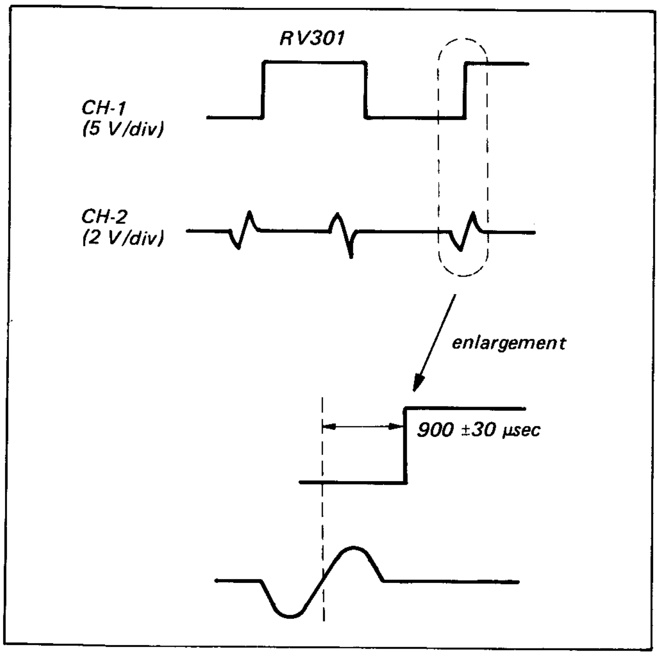

RV301
CH-1
(5 V/div)
CH-2
(2 V/div)
enlargement
900 ±30 µsec

Fig. 5-9. RF switching position adjustment (2)

5-3-2. Capstan Servo System Alignment (SA-9 Board)

1) C/R f_H Correction Adjustment
   Mode: PICTURE SEARCH (FWD)
   Signal: Alignment tape colour-bar or monoscope
   Oscilloscope: TP301 (Pin ⑦ of CN308)

   [Adjustment method]
   Adjust to 64 µsec ±0.2 µsec with RV308.
   (See Fig. 5-10.)

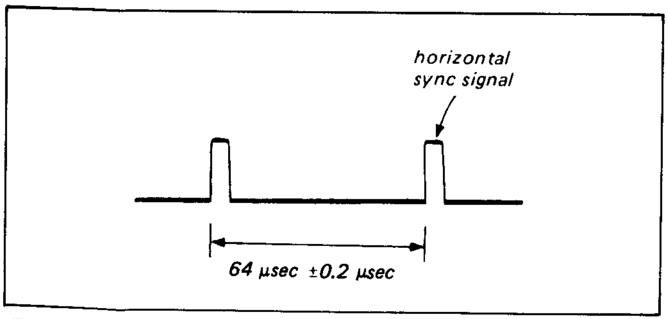

horizontal
sync signal
64 µsec ±0.2 µsec

Fig. 5-10. PICTURE SEARCH, drum free speed adjustment

2) Capstan DC Bias Adjustment (SA-9 Board)
   Mode: REC
   Oscilloscope: TP305 (Pin ⑤ of IC301)

   [Adjustment method]
   Adjust to 1.8 ±0.1 V with RV306. (See Fig. 5-11.)

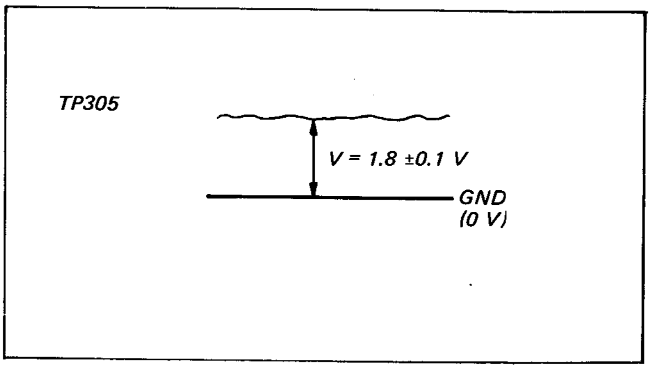

TP305
V = 1.8 ±0.1 V
GND
(0 V)

Fig. 5-11. Capstan DC bias adjustment

3) PICTURE SEARCH, Capstan DC Bias Adjustment (SA-9 Board)
   Mode: PICTURE SEARCH (FWD)
   Signal: Alignment tape colour-bar or monoscope
   Oscilloscope: TP305 (Pin ⑤ of IC301)

   [Adjustment method]
   Adjust to 1.8 ±0.1 V with RV307. (See Fig. 5-12)

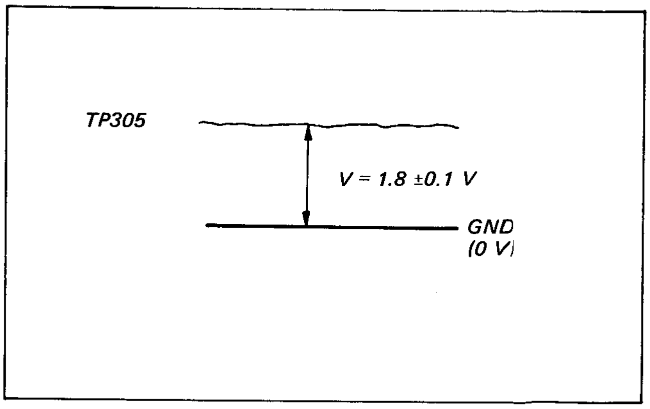

TP305
V = 1.8 ±0.1 V
GND
(0 V)

Fig. 5-12. PICTURE SEARCH, capstan DC bias adjustment

4) Tracking Center Adjustment (SA-9 Board)
Mode: E-E
Signal: Alignment tape colour-bar or monoscope
Oscilloscope: CH-1 TP303 (Pin (48) of IC301)
CH-2 TP309

[Adjustment method]

i) Set the TRACKING knob to the center click position.

ii) Adjust to 1.5 msec ±0.05 msec with RV304. (See Fig. 5-13.)

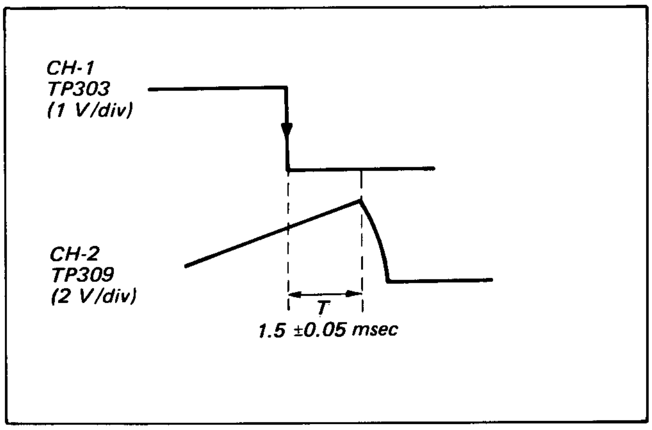


Fig. 5-13. Tracking center adjustment

5-4. PAL VIDEO SYSTEM ALIGNMENT

As a rule, first the playback system is aligned with an alignment tape to check that it operates normally, then the recording system is aligned.

The alignment sequence is shown below. The Y signal and chroma signal systems are aligned for both playback and recording systems.

Colour video signal supplied by the PAL colour-bar generator is used as video input signal for video system alignment in the record mode. Check that the sync and colour burst signals conform to the specifications designated in "Set-up for Alignment" in Fig. 5-1.

[Record System Alignment]

1) AGC adjustment
2) Carrier set adjustment
3) Deviation adjustment
4) Compress adjustment
5) White Clip adjustment
6) Y Record current adjustment
7) 4.43 MHz REF adjustment
8) AFC adjustment
9) AFC offset adjustment
10) Pilot burst signal level adjustment
11) Chroma record current adjustment

[Playback System Alignment]

1) Playback frequency characteristic adjustment
2) Expand adjustment
3) Playback video level adjustment
4) Y-comb adjustment
5) Dropout compensator adjustment
6) Carrier balance adjustment
7) Chroma comb filter adjustment
8) JOG PLL adjustment
9) JOG exchange chroma level adjustment
10) Shift adjustment

5-4-1. Record System Alignment

1) AGC Adjustment (RY-4 Board)
   Mode: E-E
   Oscilloscope: VIDEO OUT (75 Ω terminated)
   Signal: GRAY SCALE

   [Adjustment method]
   Adjust to 1 Vp-p ±0.05 Vp-p with RV021.

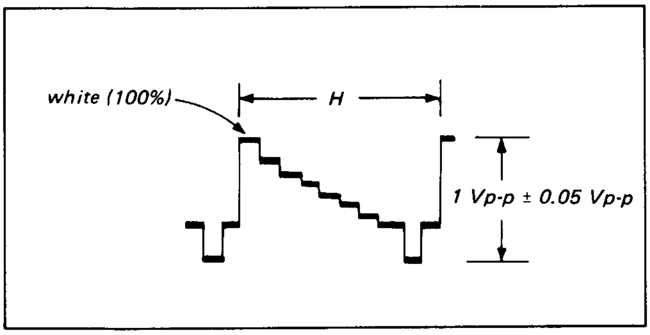


Fig. 5-14. Peak AGC adjustment

2) Carrier Set Adjustment (RY-4 Board)
   Mode: E-E
   Signal: None
   Oscilloscope: Pin ㉕ of IC009

   [Adjustment method]
   Adjust to 3.8 MHz ±0.038 MHz with RV014.

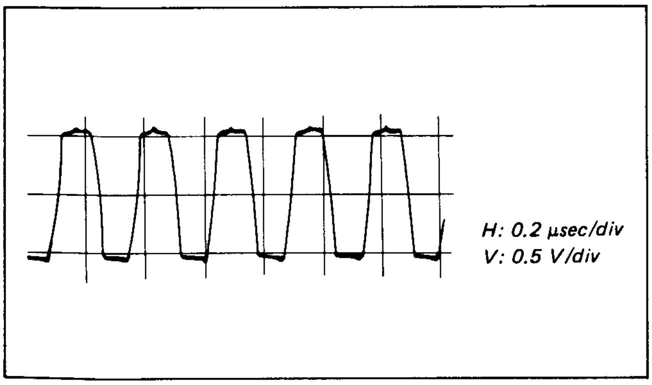


Fig. 5-15. Carrier set adjustment

3) Deviation Adjustment (RY-4 Board)
   - The playback system adjustment and the carrier set adjustment in Paragraph 2) above must be completed before making this adjustment.

   Mode: Self-recording and playback
   Signal: Colour-bar
   Oscilloscope: VIDEO OUT (75 Ω terminated)

   [Adjustment method]
   i) Supply the colour-bar signal and set up E-E mode.
   ii) Connect the oscilloscope to VIDEO OUT.
   iii) Set up RECORD mode.
   iv) Playback the recorded section of the tape.
   v) Check that the video signal level is 1.0 Vp-p ±0.05 Vp-p, if the level is outside of this range, repeat Steps iii) through iv) above adjusting with RV015 until the standard value is obtained.

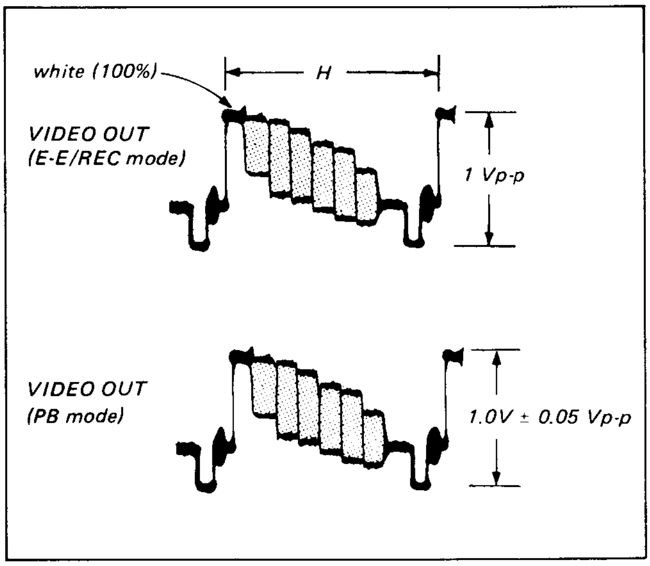


Fig. 5-16. Deviation adjustment

4) Compress Adjustment (RY-4 Board)
   Mode: E-E
   Signal: None
   Digital voltmeter: See Fig. 5-17.

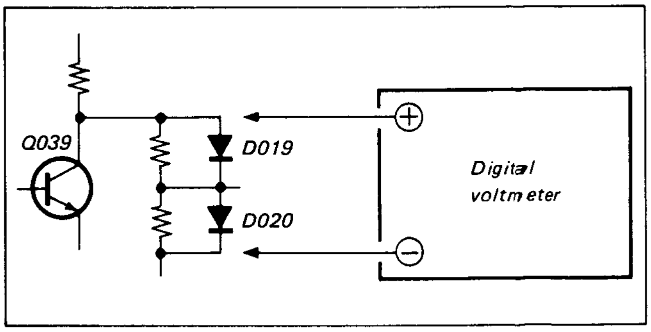


Fig. 5-17.

   [Adjustment method]
   i) Rotate RV013 counterclockwise full seen from the pattern side.
   ii) Adjust to 0.30 ±0.01 V dc using RV016.

   Note:
   Make this adjustment more than 30 sec after turning on the power switch. Make sure to adjust 5) WHITE CLIP adjustment.

5) White Clip Adjustment (RY-4 Board)
Mode: E-E
Signal: Colour-bar
Digital voltmeter: Base of Q037

[Adjustment method]
Adjust to 1.99 V ±0.05 V dc with RV013.

6) Y Record Current Adjustment (RY-4 Board)
Mode: Record
Signal: None
Oscilloscope: TP701

[Adjustment method]
Adjust to 4.0 ±0.05 Vp-p with RV703. (See Fig. 5-18.)

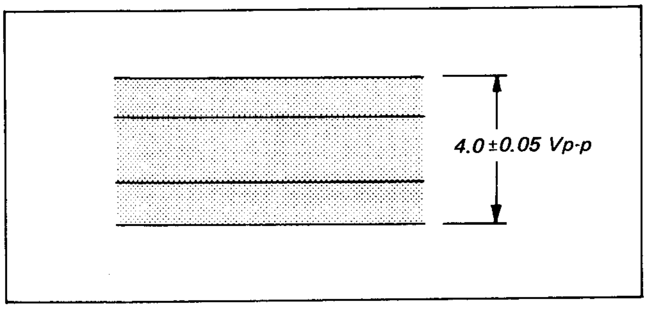


Fig. 5-18. Y record current adjustment

7) 4.43 MHz REF Adjustment (RY-4 Board)
Mode: PB
Signal: Alignment tape colour-bar
Frequency counter: Pin ⑭ of IC006

[Adjustment method]
Adjust to 4.433619 MHz ±5 Hz with CT001.

8) AFC Adjustment (RY-4 Board)
Mode: E-E
Signal: Colour-bar
Oscilloscope: Pin ㉖ of IC006

[Adjustment method]

i) Rotate RV701 counterclockwise full seen from the pattern side.
ii) Adjust to 4.5 ±0.1 V dc using RV007. (See Fig. 5-19.)

Note:
Make sure to adjust SECAM ACK after completing this adjustment. (Refer to 2) on page 206.)

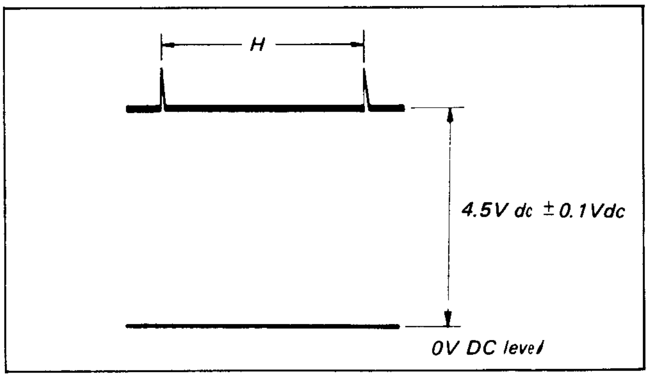


Fig. 5-19. AFC adjustment

9) AFC Offset Adjustment (RY-4 Board)
Mode: Record
Signal: Colour-bar
Oscilloscope: Pin ㉖ of IC006

[Adjustment method]

Adjust RV006 so that the fluctuation of DC level is minimum. (See Fig. 5-20.)

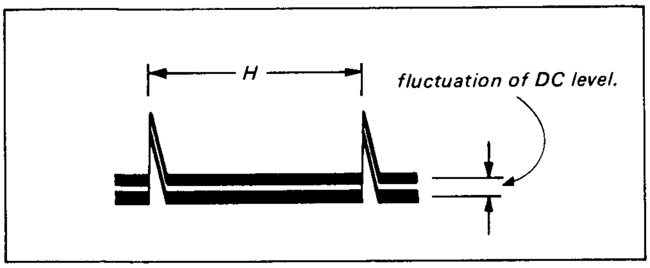

H
fluctuation of DC level.

Fig. 5-20. AFC offset adjustment

10) Pilot Burst Siganl Level Adjustment (RY-4 Board)
Mode: E-E
Signal: Colour-bar
Oscilloscope: Pin ① of IC006

[Adjustment method]

Align the pilot burst signal with the chroma signal level using RV009.

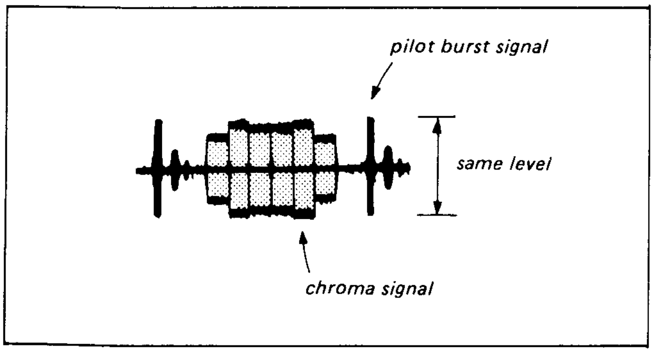

pilot burst signal
same level
chroma signal

Fig. 5-21. Pilot burst signal level adjustment

11) Chroma Record Current Adjustment (RY-4 Board)
Mode: E-E
Signal: Colour-bar
Oscilloscope: Pin ④ of CN001

[Adjustment method]

Adjust to 200 mVp-p ±5 mVp-p with RV008. (See Fig. 5-22.)

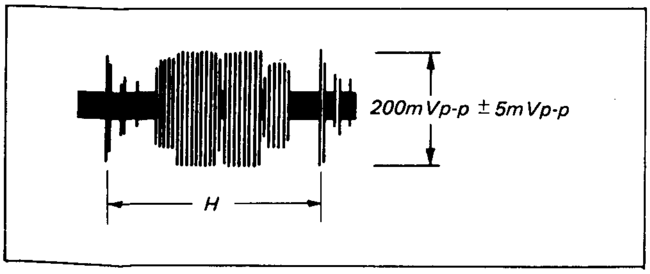

200mVp-p ± 5mVp-p
H

Fig. 5-22. Chroma record current adjustment

5-4-2. Playback System Alignment

1) Playback Frequency Characteristic Adjustment (RY-4 Board)
- Adjust both the A and B channels.
- The B channel indicated by ( ).

Mode: Playback
Signal: Alignment tape RF sweep
Oscilloscope: Pin ⑤ of CN702
External trigger: Pin ④ of CN702

[Adjustment method]

i) Rotate the tracking knob to make 2 MHz to be maximum.
ii) Rotate RV704 to adjust the 2 MHz level of B-ch to be less than ±20 mV to the 2 MHz level of A-ch.
iii) Set the trigger slope to −(+).
iv) Adjust the 5.2 MHz amplitude to 62 – 76% of the 2 MHz amplitude with RV702 (RV701).

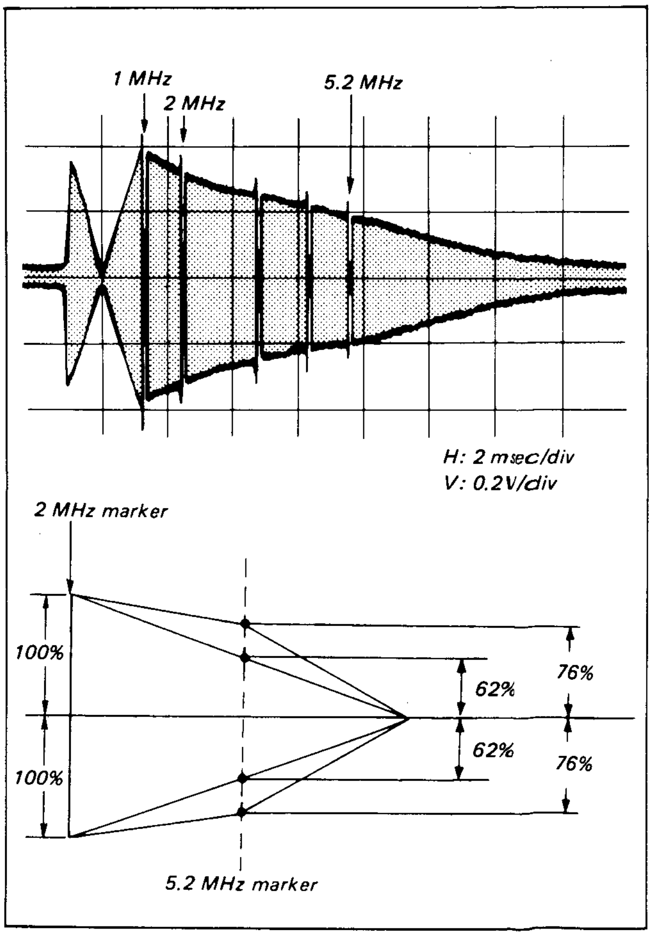

1 MHz
2 MHz
5.2 MHz
H: 2 msec/div
V: 0.2V/div
2 MHz marker
100%
100%
62%
76%
62%
76%
5.2 MHz marker

Fig. 5-23. Playback amplifier frequency characteristic adjustment

2) Expand Adjustment (RY-4 Board)
Mode: Playback
Signal: Colour-bar
Digital voltmeter: See Fig. 5-24.

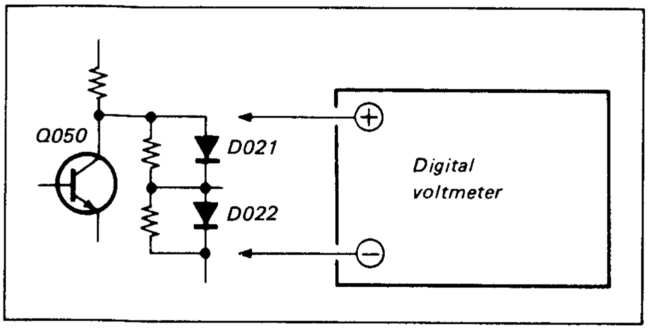


Fig. 5-24.

[Adjustment method]

Adjust to 0.5 ±0.01 V dc using RV020.

Note: on

Adjust more than 30 sec after turning on the power switch.

3) Playback Video Level Adjustment (RY-4 Board)

Mode: Playback

Signal: Alignment tape colour-bar

Oscilloscope: VIDEO OUT (75 Ω terminated)

[Adjustment method]

Adjust to 1.0 V ±0.05 Vp-p with RV019.

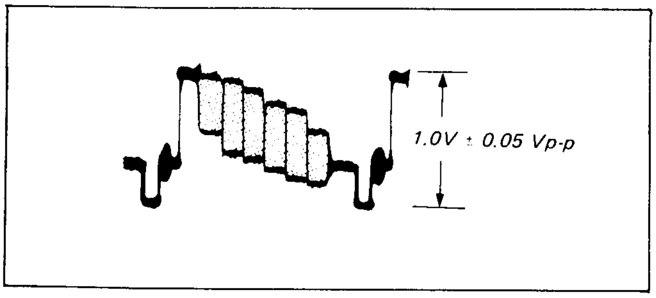


Fig. 5-25. Playback video level adjustment

4) Y-Comb Adjustment (RY-4 Board)

Mode: Playback

Signal: Colour-bar

Oscilloscope: Pin ⑧ of IC401

[Adjustment method]

Rotate RV401 to adjust so that the limiter works vertically symmetrically. (See Fig. 5-26.)

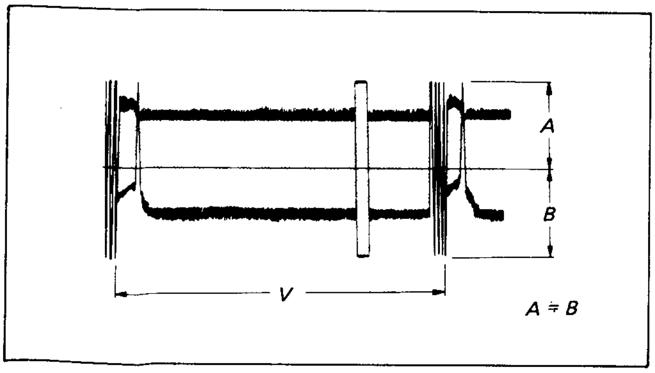


Fig. 5-26. Y-comb adjustment

5) Dropout Compensator Threshold Adjustment (RY-4 Board)

Mode: Playback

Signal: A recorded tape with dropouts

[Adjustment method]

i) Turn RV010 fully clockwise (↻) as seen from the pattern side. In this state, dropouts appear on the monitor screen.

ii) Slowly turn RV010 counterclockwise (↺) and set to make the dropouts disappear.

iii) Rewind the tape and verify that the dropouts described in ii) above have disappeared.

6) Carrier Balance Adjustment (RY-4 Board)

Mode: Playback

Signal: Alignment tape colour-bar

Adjust while observing the monitor TV screen.

[Adjustment method]

Minimize beats with RV005.

7) Chroma Comb Filter Adjustment (RY-4 Board)

Mode: Playback

Signal: Alignment tape colour-bar

Adjust while observing the monitor TV screen.

[Adjustment method]

Minimize beats with RV501 and LV501.

8) JOG PLL Adjustment (RY-4 Board)

Mode: E-E

Signal: Colour-bar

Oscilloscope: Pin 10 of IC003

[Adjustment method]

Adjust to 20 μsec ±1 μsec with RV003.
(See Fig. 5-27.)

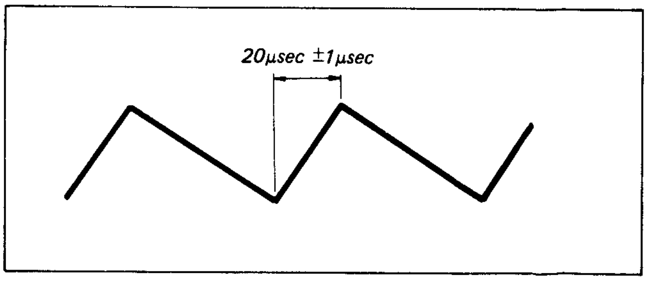


Fig. 5-27. JOG PLL adjustment

9) JOG Exchange Chroma Level Adjustment
(RY-4 Board)
Mode: PB-PAUSE (STILL)
Signal: Colour-bar
Osciiloscope: Pin ⑧ of IC003

[Adjustment method]

Adjust RV002 so that the fluctuation of level is minimum. (See Fig. 5-28.)

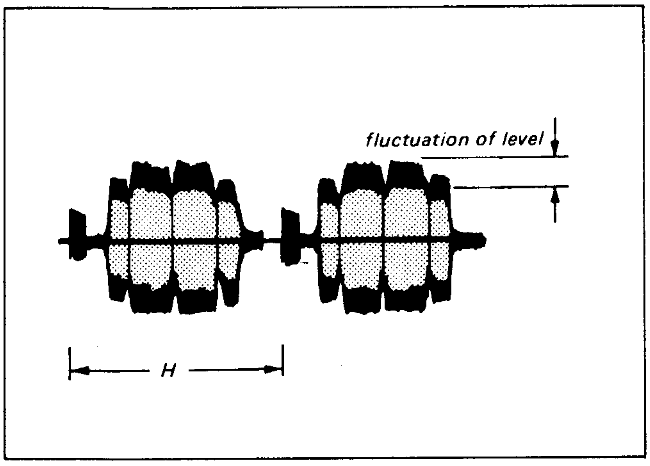


Fig. 5-28. JOG EXCH. C. level adjustment

10) Shift Adjustment (RY-4 Board)
Mode: PB-PAUSE (STILL)
Signal: Alignment tape colour-bar
Oscilloscope: Pin ㉓ and ㉔ of IC003

[Adjustment method]

Adjust to the signal level (per 1H) with RV004.

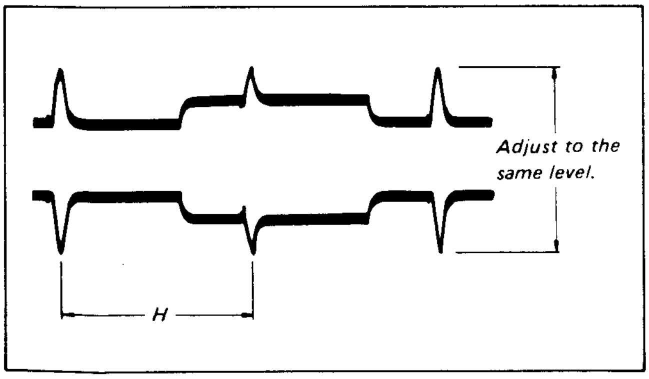


Fig. 5-29. Shift adjustment

5-5. SECAM VIDEO SYSTEM ALIGNMENT (EC MODEL)

- Make this adjustment after aligning the PAL video system.
- For this adjustment, use the equipment listed below in conjunction with an alignment tape and SECAM colour-bar signals.

[Equipment Required]

(1) SECAM Colour Monitor TV
(2) Oscilloscope, Dual-trace, Bandwidth . . . more than 10 MHz with delay mode
(3) SECAM Colour-Bar Generator
(4) Alignment Tape, Type: KR5-1J, Code No. 8-969-996-03

[Setup for Alignment]

In this alignment, video signals obtained from the pattern generator will be used as alignment signals. Therefore, the video output signals should be within the specifications. Verify video signals by connecting an oscilloscope to VIDEO OUT connector (75 Ω terminated). Check that the video signals are flat when the amplitude of the horizontal sync signal is about 0.3 Vp-p, the amplitude of the video portion is about 0.7 Vp-p, and the amplitude of the burst signal is about 0.3 Vp-p.
The video signal (colour-bar signal) used in this alignment is shown in Fig. 5-30.

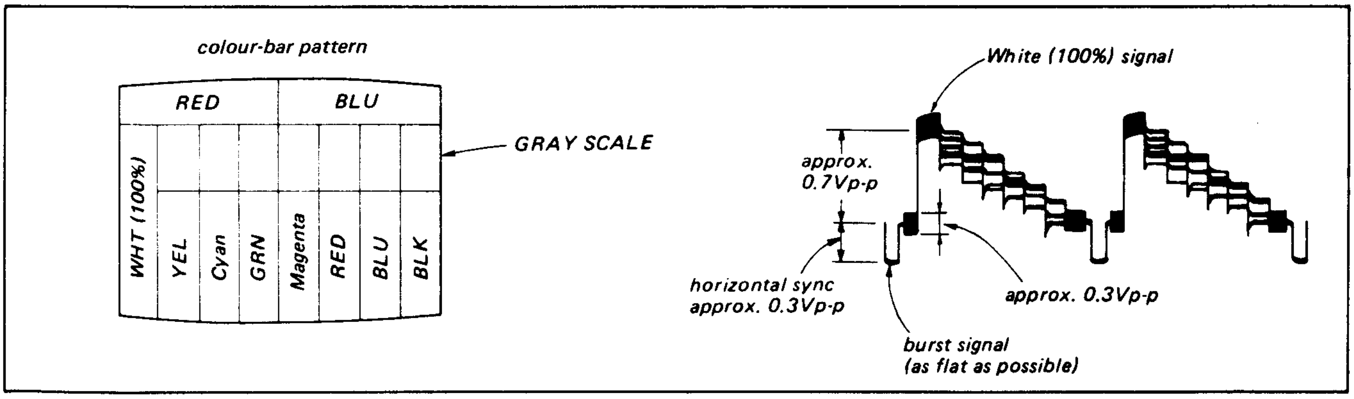

colour-bar pattern
RED
BLU
GRAY SCALE
WHT (100%)
YEL
Cyan
GRN
Magenta
RED
BLU
BLK
White (100%) signal
approx. 0.7Vp-p
horizontal sync approx. 0.3Vp-p
approx. 0.3Vp-p
burst signal (as flat as possible)

Fig. 5-30. SECAM video (colour-bar) signal

[Alignment Tape]
KR5-1J

	Video signal	Audio signal	Playing time	Use for
1.	Colour-bars	3 kHz – 5 dB	5 min	General performance, tape speed checks, switching position adjustment.
2.	Monoscope	333 Hz – 25 dB	5 min	Video head dihedral, audio level adjustment.
3.	RF sweep	5 kHz – 25 dB	5 min	Video, audio frequency characteristics, audio azimuth adjustment. marker: 1, 2, 3.58, 4.5, 5.2 MHz
4.	Tracking 1 MHz (CH-B) *1 (Channel B is inserted in every 3 frames.)	1 kHz – 5 dB *2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check. (Check if *1 and *2 are the same position.)

[Colour-Bar Signal]

The 100% colour-bar signal recorded on the Alignment tape is shown in Fig. 5-31.

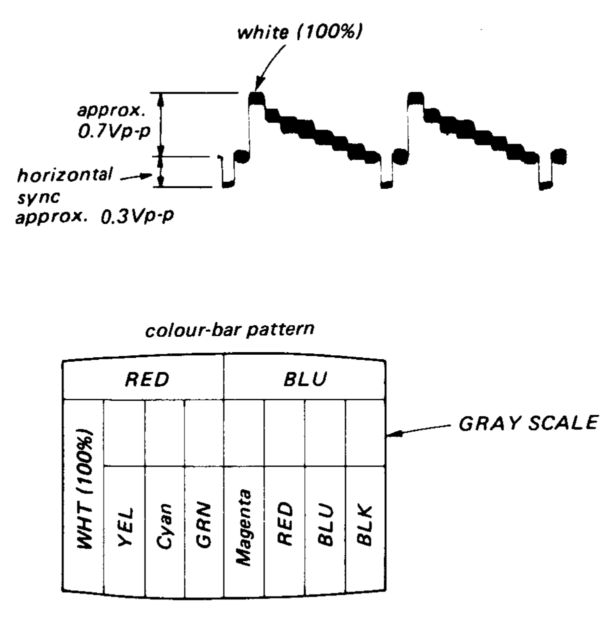

white (100%)
approx. 0.7Vp-p
horizontal sync approx. 0.3Vp-p
colour-bar pattern
RED
BLU
GRAY SCALE
WHT (100%)
YEL
Cyan
GRN
Magenta
RED
BLU
BLK

Fig. 5-31. Colour-bar signal recorded on the alignment tape

1) Bell Filter Adjustment (RY-4 Board)
   Mode: E-E
   Signal: SECAM colour-bar
   Oscilloscope: Pin ⑥ of IC004

[Adjustment method]

Adjust LV003 until the waveform is flat.
(See Fig. 5-32.)

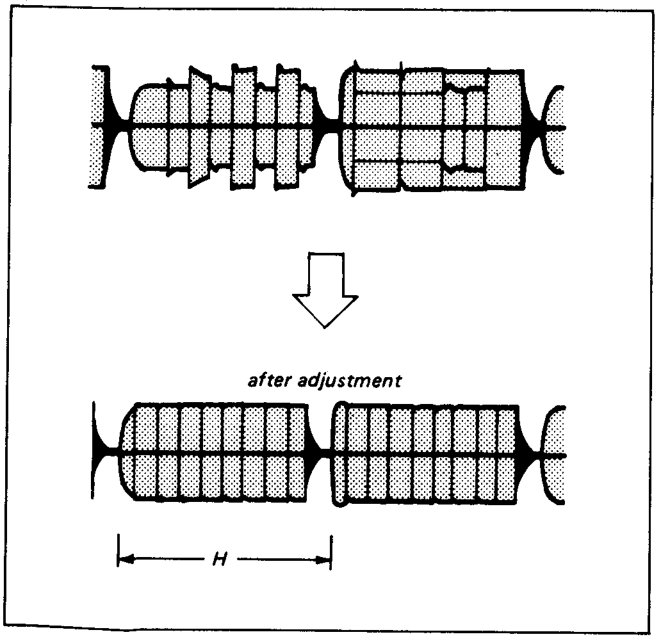

after adjustment
H

Fig. 5-32. Bell filter adjustment

2) SECAM ACK Adjustment (RY-4 Board)
   Mode: E-E
   Signal: SECAM colour-bar
   Oscilloscope: Pin ⑨ of IC002

[Adjustment method]

i) Rotate LV001 to make the waveform amplitude to be maximum.
ii) Adjust RV001 to 4.8 V ±0.2 Vp-p.

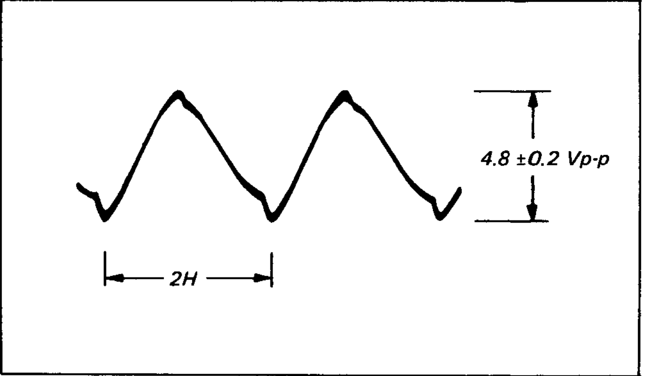


Fig. 5-33. SECAM ACK adjustment

3) Counter Bell Filter Adjustment (RY-4 Board)
   Mode: Self-recording and playback
   Signal: SECAM colour-bar
   Adjust while observing the monitor TV screen.

[Adjustment method]

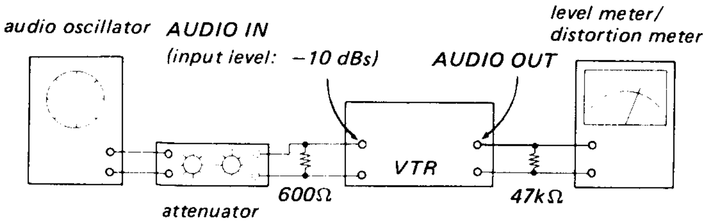
i) Record SECAM colour-bar signals.
ii) Playback the recorded signals.
iii) While observing the monitor TV screen, adjust LV002 until the border between the red and blue areas is at its cleanest (minimum beats).

5-6. AUDIO SYSTEM ADJUSTMENT

Use a Dynamicron tape for adjustments.

[Connection of Related Equipment]

Note:
Set the INPUT SELECT switch to LINE.



5-6-1. Normal Audio System Adjustment (SA-9 Board)

Note:
Set the BETA HI-FI switch to NORM.

[Adjustment method]

1. ACE head adjustment . . . See "Mechanical Adjustment"
2. Playback frequency characteristic check
3. Playback output level adjustment
4. Bias oscillator check
5. Record bias adjustment
6. Overall frequency characteristic check
7. Overall S/N check
8. Overall distortion check

1. ACE Head Adjustment

Refer to "Mechanical Adjustment"

2. Playback Frequency Characteristic Check

(1) Connect TP502 and GND with a jumper wire so as to turn off the HI CUT operation.
(2) Play back 333 Hz and 5 kHz from the alignment tape and check so that the level difference between 333 Hz and 5 kHz is within 0 dB ±1 dB.
(3) Remove the jumper wire after making the adjustment.

3. Playback Output Level Adjustment

(1) Play back 333 Hz from the alignment tape and adjust so that the output level is −30 dBs ±0.5 dB with RV501.

4. Bias Oscillator Check

(1) Set the input signal level to zero and set up the RECORD mode.
(2) Connect a frequency counter to Pin ② of CN502. The reading should be 65 kHz ±6.5 kHz. (See Fig. 5-34.)

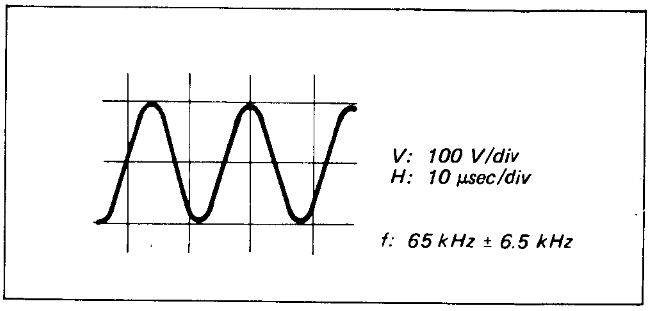


Fig. 5-34. Bias oscillator check

5. Record Bias Adjustment

Check that "Playback frequency characteristic adjustment" has been made.

(1) Connect TP501 and GND with a jumper wire so as to turn off the AGC operation.
Connect TP502 and GND with a jumper wire so as to turn off the HI CUT operation.
(2) Supply a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −30 dBs.
(4) Record signals.
(5) Supply a frequency of 7 kHz and perform Steps (3) and (4) above.
(6) Play back the recorded section of the tape and check that the output level at 7 kHz is ± 1 dB relative to the output level at 333 Hz. If the level is outside this range, repeat Steps (2) through (5) adjusting with RV502 until the standard is met.
(7) Remove the jumper wire after making the adjustment.

6. Overall Frequency Characteristic Check

(1) Connect TP501 and GND with a jumper wire so as to turn off the AGC operation.
Connect TP502 and GND with a jumper wire so as to turn off the HI CUT operation.
(2) Connect a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −30 dBs.
(4) Record signals.
(5) Change the frequency to 50 Hz, 100 Hz, 7 kHz and 10 kHz and repeat Steps (3) and (4).
(6) Play back the recorded section of the tape and verify that the level is within the specification. (See Fig. 5-35.)

Standard values: With reference to the 333 Hz playback output level.

50 Hz $^{+2.5}_{-10}$ dB

100 Hz $^{+2.5}_{-3}$ dB

7 kHz $^{+2.5}_{-2.5}$ dB

10 kHz $^{+2.5}_{-20}$ dB

(7) If the specified values cannot be attained, perform 2 and 5 again. "Playback Frequency Characteristic Adjustment" and "Record Bias Adjustment".
(8) Remove the jumper wire after making the adjustment.

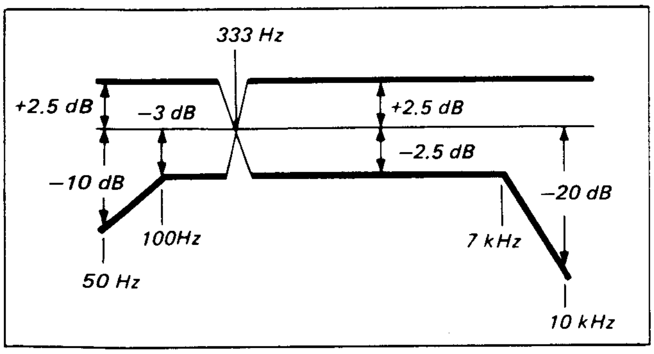


Fig. 5-35. Overall frequency characteristic

7. Overall S/N Check

(1) Supply a 333 Hz signal at −10 dBs.
(2) Record signals.
(3) Set the input signal level to zero and record signals.
(4) Play back the recorded section of the tape and check that the output level difference is greater than 38 dB.

8. Overall Distortion Check

(1) Supply a 333 Hz signal at −10 dBs.
(2) Record signals.
(3) Play back the recorded section of the tape and verify that the distortion is below 4%.

5-6-2. BETA Hi-Fi Audio System Adjustment (AF-7, TM-79, TM-80 Boards)

Note:
Set the LPF switch to OFF.
Set the BETA hi-fi switch to AUTO.
( ) is R-CH.

[Adjustment method]

1. E-E input level adjustment
2. Dynamic emphasis adjustment
3. AFM carrier frequency adjustment
4. AFM deviation adjustment
5. AFM record current adjustment
6. Level meter adjustment
7. RF input level adjustment
8. Demodulator DC level adjustment
9. Level and level balance adjustment
10. Demodulator DC offset adjustment
11. Overall frequency characteristic check
12. Overall distortion check
13. Overall S/N check

1. E-E Input Level Adjustment

(1) Input at 400 Hz and −10 dB signal to the audio line input to set up a RECORD state. (Adjust the REC level volume control to the center click.)
(2) Adjust the level of Pin ㊵ (Pin ③) of IC004 on AF-7 board to be −26.5 ±0.5 dB using RV502 (RV503) on TM-79 board.

2. Dynamic Emphasis Adjustment

(1) Input a 400 Hz and −10 dB signal to the audio line input to set up a RECORD state. (Adjust the REC level volume control to the center click.)
(2) Connect VTVM to the + side of C070 and adjust the level to −20.0 ±0.1 dB using RV012.

3. AFM Carrier Frequency Adjustment

(1) Connect a frequency counter to TP012 [Emitter of Q024] (TP011 [Emitter of Q025]) in a no-signal state (shorted between the audio line input and GND) to set up a RECORD state.
(2) Adjust to 1.44 MHz ±1 kHz (2.1 MHz ±1 kHz) using RV006 (RV011).
(3) Restore the shorting between the line input and GND after completing the adjustment.

4. AFM Deviation Adjustment

(1) Input and record a 400 Hz and −10 dB signal to the audio line input and play back the recorded part. (Adjust the REC level volume control to the center click.)
(2) Adjust RV007 (RV010) so that the output when played back will be the same as that of the audio line output in the E-E mode.

5. AFM Record Current Adjustment

(1) Short between the audio line input and GND to set up a no-signal state.

(2) Connect an oscilloscope to Pin ⑤ of CN008 (on AF-7 Board).

(3) Adjust f_2 to 220 ±5 mVp-p using RV008 and check that f_1 is inside 62 ±5 mVp-p.

(4) Restore the shorting between the line input and GND after completing the adjustment.

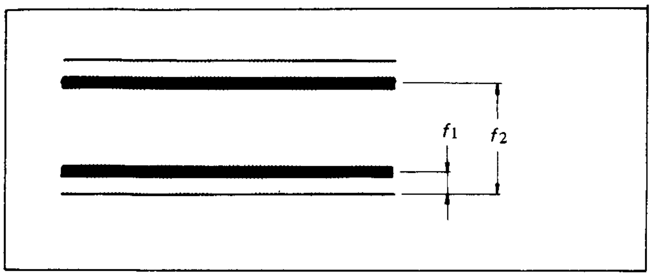


Fig. 5-36. AFM record current

6. Level Meter Adjustment (TM-80 Board)

(1) Input a 400 Hz and −10 dB signal to the audio line input.

(2) Short between Pin ③ of CN002 (−10 V) and GND. Measure the voltage at the mechanical center of RV302 using a digital voltmeter, and adjust to 0.915 V ±0.02 V with RV302.

(3) Short between Pin ③ of CN002 (−10 V) and GND. Measure the voltage at the mechnical center of RV301 using a digital voltmeter, and adjust to 0.915 V ±0.02 V with RV301.

7. RF Input Level Adjustment

Note:

Make this adjustment after checking that the AFM record current has been adjusted. Rotate and adjust the tracking control knob so that the Pin ① of CN013 output waveform becomes maximum.

(1) Connect the 4700 Ω resister between Pin ① and ② of CN013.

(2) Play back the BETA Hi-Fi alignment tape (KR5-10C).

(3) Connect an oscilloscope to Pin ① of CN013 and adjust to 1.9 Vp-p ±0.1 Vp-p with RV009.

(4) After the adjustment, disconnect the 4700 Ω resistor between Pin ① and ② of CN103.

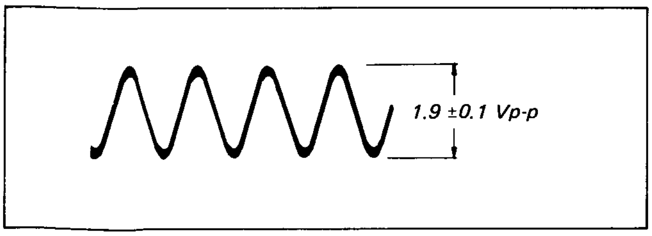


Fig. 5-37. RF input level adjustment

8. Demodulator DC Level Adjustment

(1) Short between the audio line input and GND, and record.

(2) Play back the recorded part.
Connect an digital voltmeter to TP016 (TP015) and adjust to 2.2 V ±0.1 VDC (2.0 V ±0.1 VDC) with RV003 (RV016).

9. Level and Level Balance Adjustment

(1) Play back the BETA Hi-Fi alignment tape (KR5-10C).

(2) Connect an oscilloscope to TP005 (TP006) and adjust to −20 dB ±0.1 dB with RV001 and RV002 (RV014 and RV015), and to eliminate the level difference. (See Fig. 5-38.)

(3) Restore the shorting between the audio line input and GND.

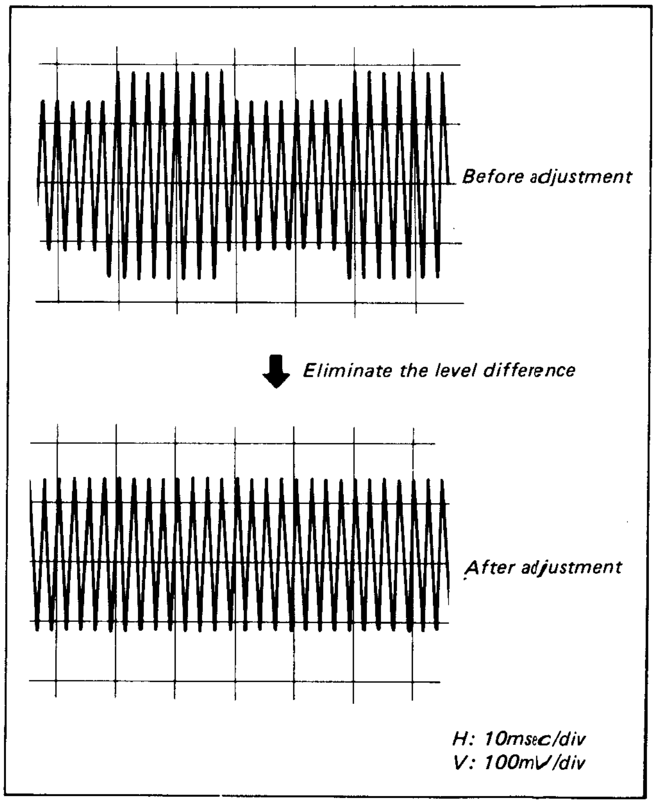


Fig. 5-38. Playback level balance adjustment

10. Demodulator DC Offset Adjustment

(1) Input a 10 kHz and −10 dB signal to the audio line input.

(2) Record the signal and play back the recorded part. Check the waveform from the audio line output, and adjust to make the DC difference in grade minimum with RV017 (L-CH) and RV018 (R-CH).

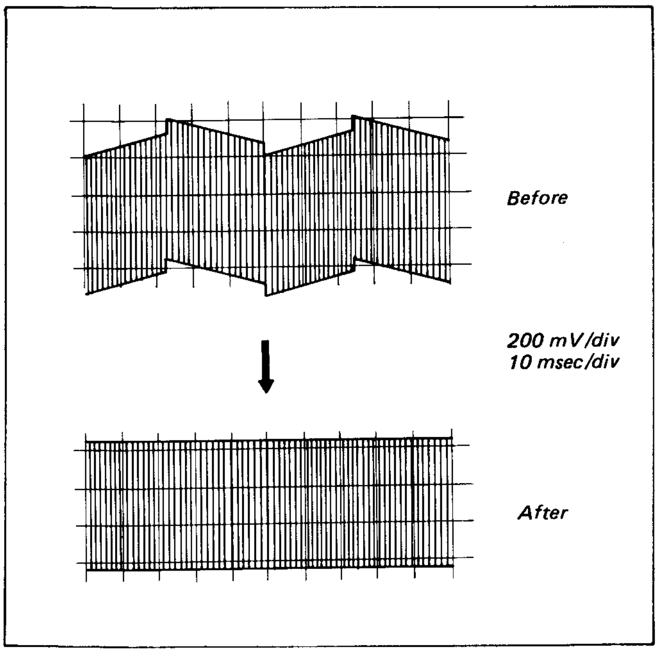


Fig. 5-39. Demodulator DC offset adjustment

11. Overall Frequency Characteristic Check

(1) Feed a 400 Hz signal to the audio line input. Set up the E-E mode and adjust the attenuator so that the audio line output level becomes −10 dB.

(2) Record the signal.

(3) Change the ferequency to 20, 100, and 400 Hz, as well as to 10 kHz and 20 kHz, then repeat Steps (1) and (2).

(4) Play back the recorded part and check that the output levels are inside the standard. (See Fig. 5-40.)

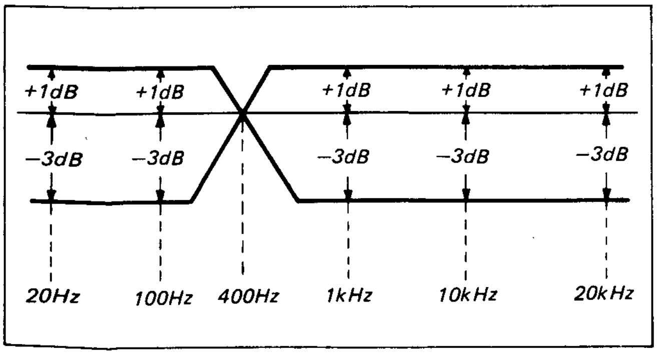


Fig. 5-40. Overall Frequency Characteristic Check

12. Overall Distortion Check

(1) Supply a 400 Hz signal at −10 dB.

(2) Record the signal.

(3) Play back the recorded part of the tape and verify that the distortion is below 0.5%.

13. Overall S/N Check

(1) Supply a 1 kHz signal at −10 dBs.

(2) Record signals.

(3) Set the input signal level to zero and record signals.

(4) Playback the recorded section of the tape and check that the output level difference is greater than 63 dB. (Measure at IHF-A wating curve.)

5-7. TUNER SYSTEM ADJUSTMENT (TU-73 Board)

1. Tuner AGC Adjustment

(1) Receive broadcast TV signals in the highest contrast.

(2) Turn RV001 until snow (intensity-modulated display) noise appears on the TV screen.

(3) Turn RV001 backward until the snow (intensity-modulated display) noise disappears.

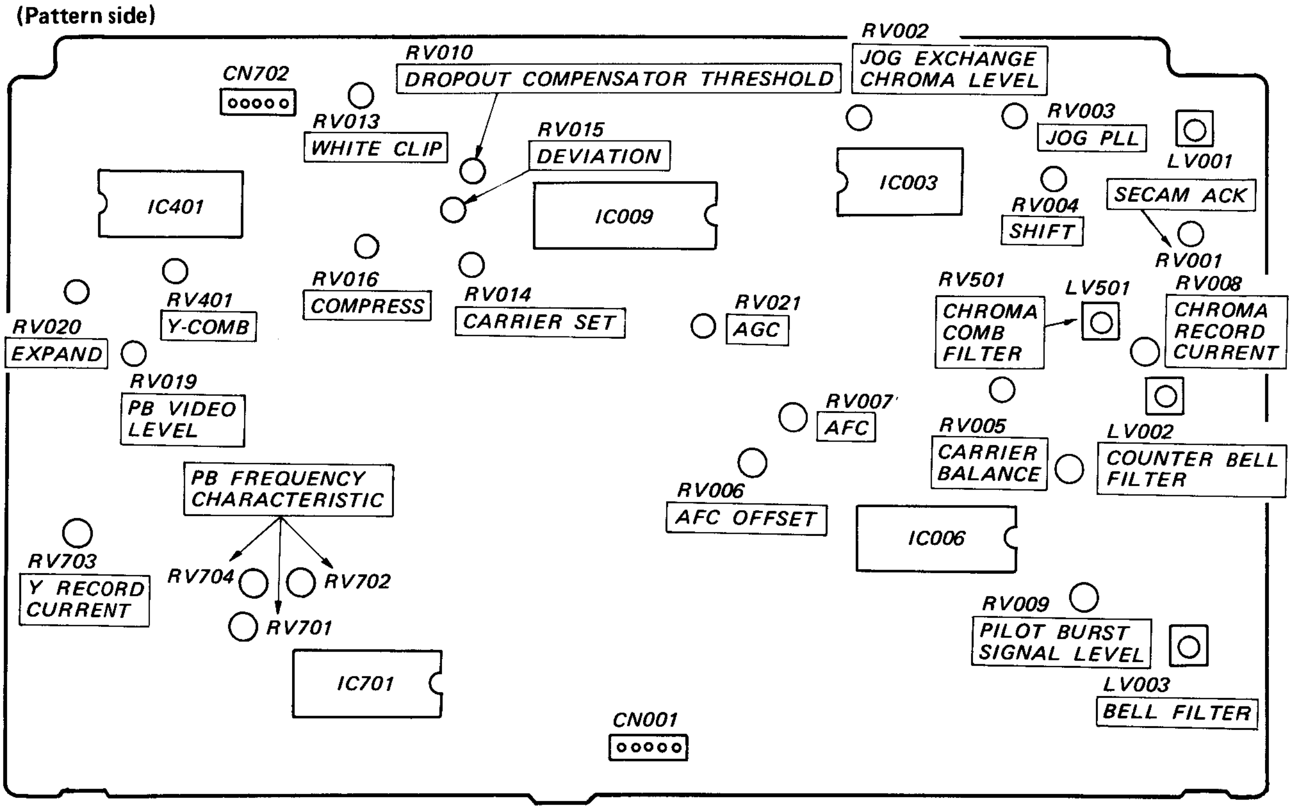
(4) Receive signals of all channels in turn, and ensure that there is no cross modulation beat, image deformation nor snow noise effect.

2. Stereo Separation Adjustment

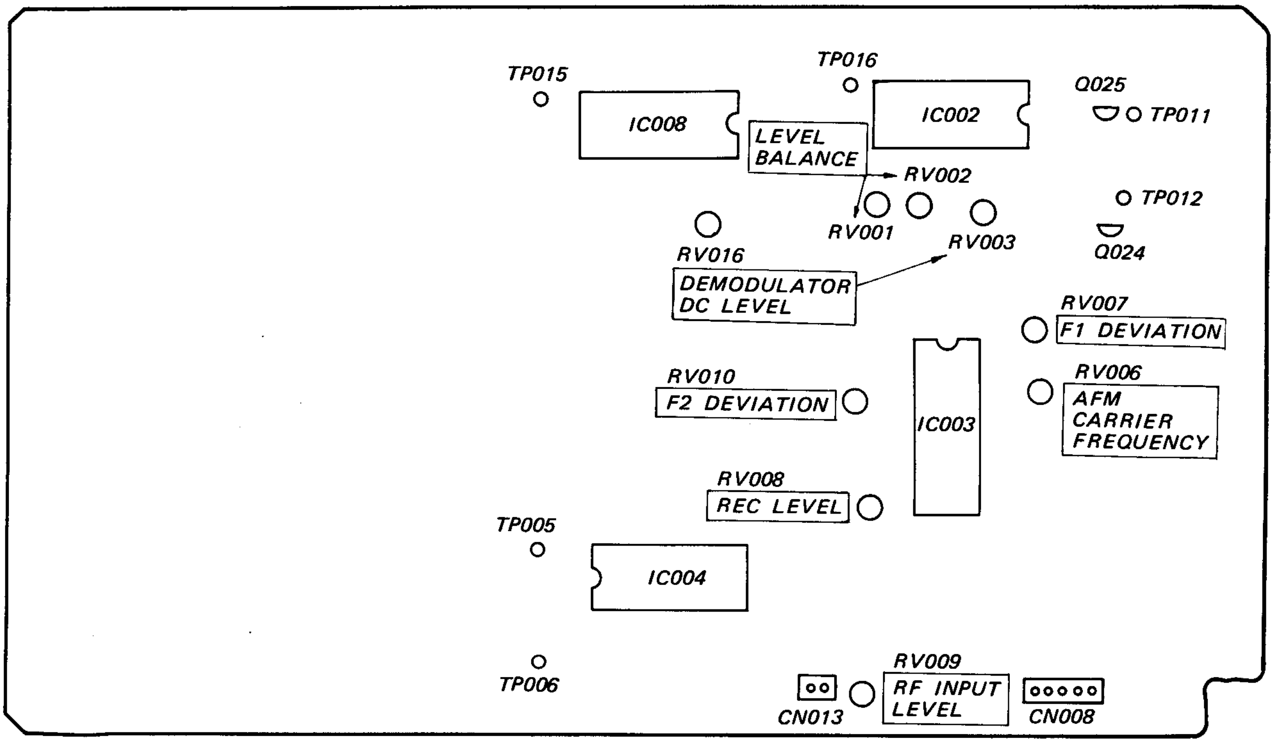
(1) L-CH and R-CH receive 400 Hz and 1 kHz stereo signals respectively from the signal generator.

(2) Connect an oscilloscope to Pin ① of CN002 and adjust RV002 so that the shaking by 1 kHz of the 400 Hz waveform becomes smallest.

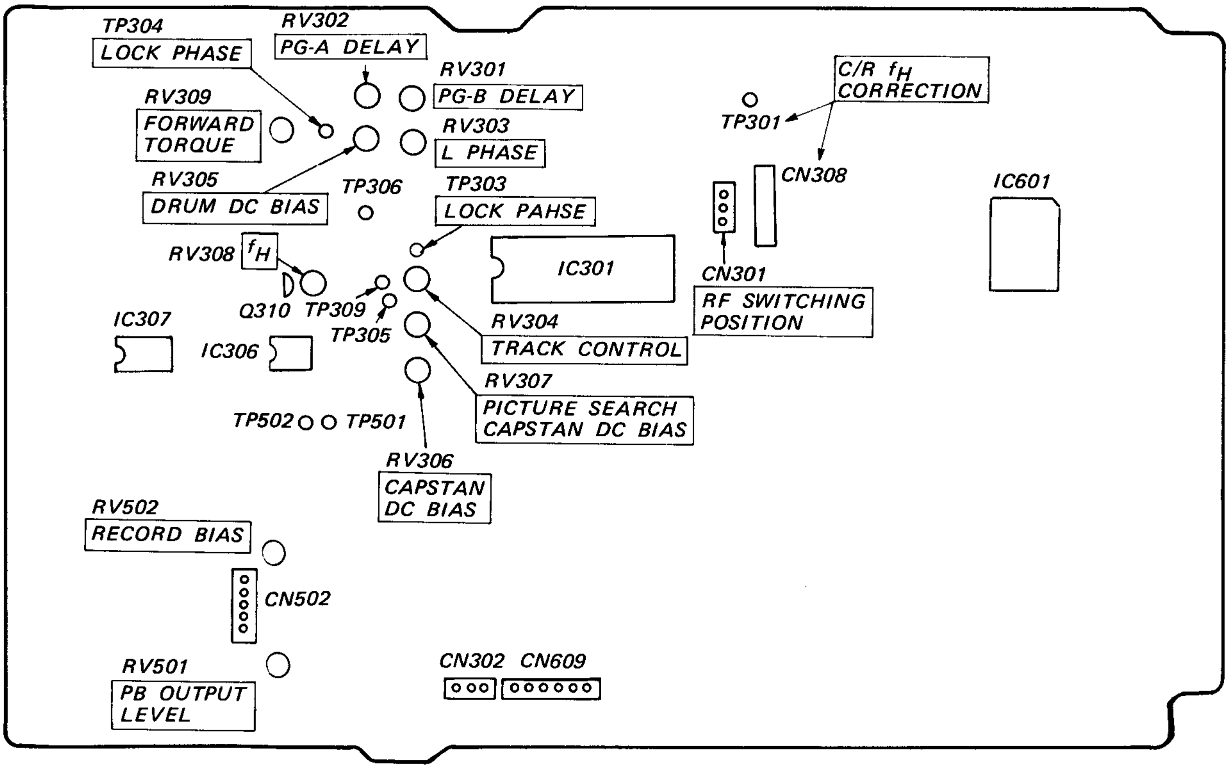
RY-4 board
(Pattern side)


RV002
JOG EXCHANGE CHROMA LEVEL
RV010
DROPOUT COMPENSATOR THRESHOLD
CN702
RV013
WHITE CLIP
RV015
DEVIATION
RV003
JOG PLL
LV001
IC401
IC009
IC003
RV004
SHIFT
SECAM ACK
RV001
RV016
COMPRESS
RV014
CARRIER SET
RV021
AGC
RV501
LV501
RV008
RV020
EXPAND
RV401
Y-COMB
CHROMA COMB FILTER
CHROMA RECORD CURRENT
RV019
PB VIDEO LEVEL
RV007
AFC
RV005
CARRIER BALANCE
LV002
COUNTER BELL FILTER
PB FREQUENCY CHARACTERISTIC
RV006
AFC OFFSET
IC006
RV703
Y RECORD CURRENT
RV704
RV702
RV701
RV009
PILOT BURST SIGNAL LEVEL
IC701
LV003
BELL FILTER
CN001

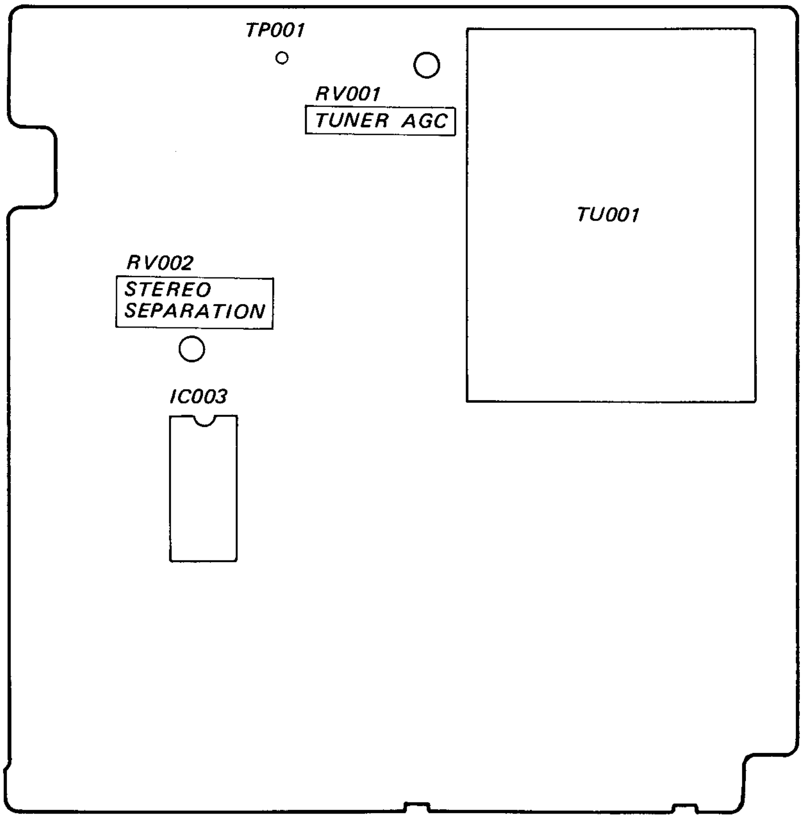
AF-7 board
(Component side)


TP015
TP016
Q025
TP011
IC008
IC002
LEVEL BALANCE
RV002
TP012
RV001
RV003
RV016
Q024
DEMODULATOR DC LEVEL
RV007
F1 DEVIATION
RV010
F2 DEVIATION
IC003
RV006
AFM CARRIER FREQUENCY
RV008
REC LEVEL
TP005
IC004
TP006
RV009
RF INPUT LEVEL
CN013
CN008

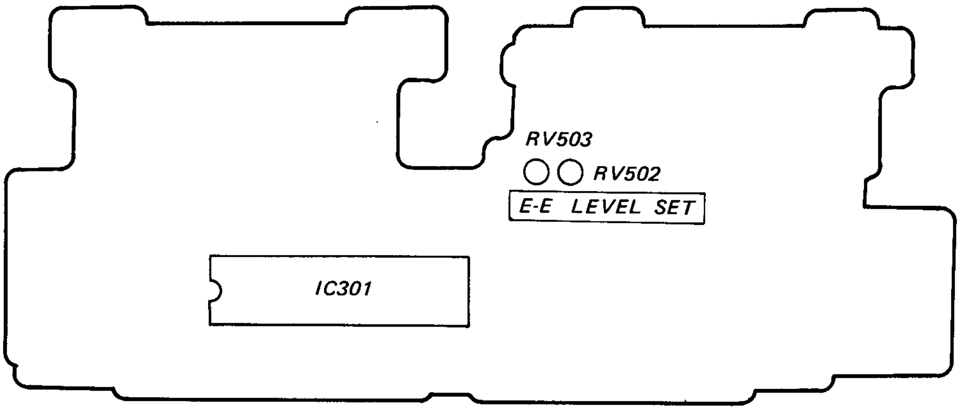
SA-9 board
(Component side)


TP304
LOCK PHASE
RV302
PG-A DELAY
RV301
PG-B DELAY
RV309
FORWARD TORQUE
RV303
L PHASE
RV305
DRUM DC BIAS
TP306
TP303
LOCK PAHSE
C/R f_H CORRECTION
TP301
CN308
IC601
RV308
f_H
IC301
CN301
RF SWITCHING POSITION
Q310
TP309
TP305
IC307
IC306
RV304
TRACK CONTROL
RV307
PICTURE SEARCH CAPSTAN DC BIAS
TP502
TP501
RV306
CAPSTAN DC BIAS
RV502
RECORD BIAS
CN502
RV501
PB OUTPUT LEVEL
CN302
CN609

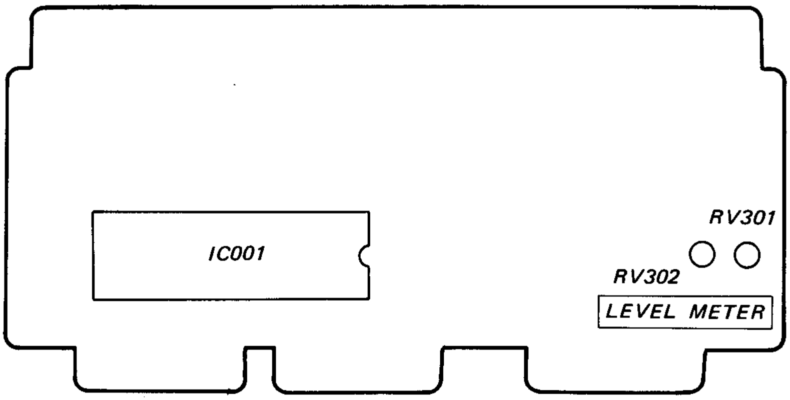
TU-73 board
(Component side)


TP001
RV001
TUNER AGC
TU001
RV002
STEREO SEPARATION
IC003

TM-79 board
(Component side)

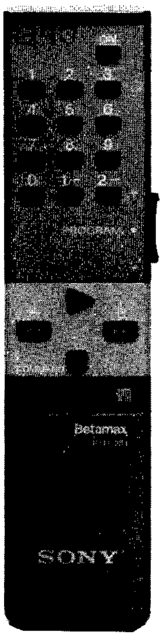

RV503
RV502
E-E LEVEL SET
IC301

TM-80 board
(Component side)


IC001
RV301
RV302
LEVEL METER

RMT-231

SERVICE MANUAL

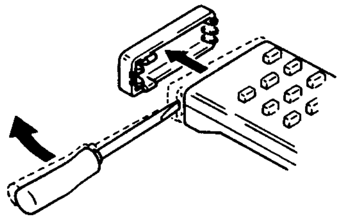


SPECIFICATIONS

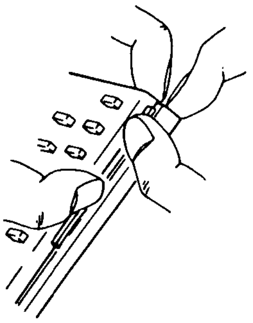
Remote Commander RMT-231

Remote control system	Infrared control
Power requirements	3V dc, 2 IEC designation R6 batteries (size AA)
Dimensions	Approx. 45 × 20 × 175 mm (w/h/d) ($1^3/_4$ × $^3/_4$ × 7 inches) incl. projecting parts and controls
Weight	Approx. 105 g (3.7 oz) incl. batteries

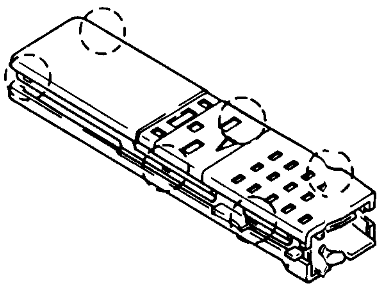
Disassembly



① Remove the front panel by prying up with a screwdriver.



② While pulling the lower case outward, lift the upper case and free the claw.



③ Free all 6 claws similarly.

REMOTE COMMANDER

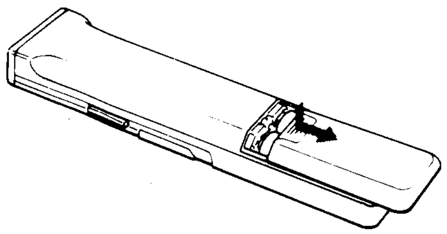
SONY®

1. REMOTE CONTROL OPERATION

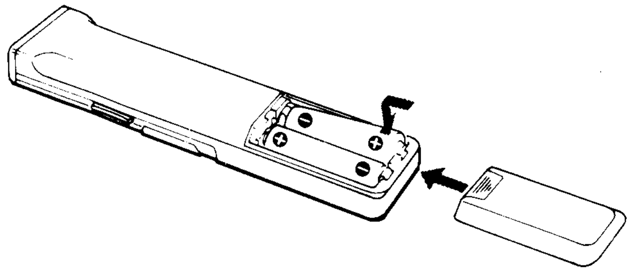
You can control almost all the functions of this video cassette recorder from your armchair using the supplied Remote Commander.

BATTERY INSERTION

1 Open the lid.



2 Insert two IEC designation R6 batteries with correct polarity.



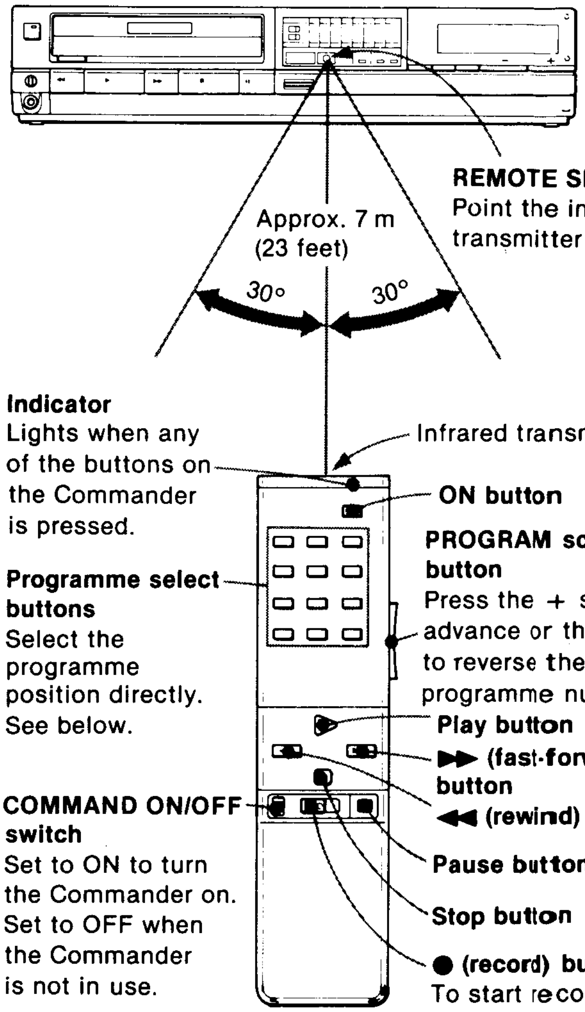
3 Close the lid firmly.

Battery life
In normal operation, batteries will last for about six months. If the range of the Remote Commander becomes noticeably short, replace the batteries with new ones. When the batteries are exhausted, the remote function indicator on the Commander will not light when the buttons on the Commander are pressed.

If the Commander is not to be used for a long period of time, remove the batteries to avoid possible damage from battery leakage.

Notes
- There should be no obstacles between the Commander and the REMOTE SENSOR of the recorder.
- The shorter the distance between the Commander and the recorder, the wider the angle within which the recorder can be controlled.

OPERATION



REMOTE SENSOR
Point the infrared transmitter here.

Indicator
Lights when any of the buttons on the Commander is pressed.

Infrared transmitter

ON button

PROGRAM scan button
Press the + side to advance or the – side to reverse the programme numbers.

Programme select buttons
Select the programme position directly. See below.

Play button

▶▶ (fast-forward) button

◀◀ (rewind) button

COMMAND ON/OFF switch
Set to ON to turn the Commander on. Set to OFF when the Commander is not in use.

Pause button

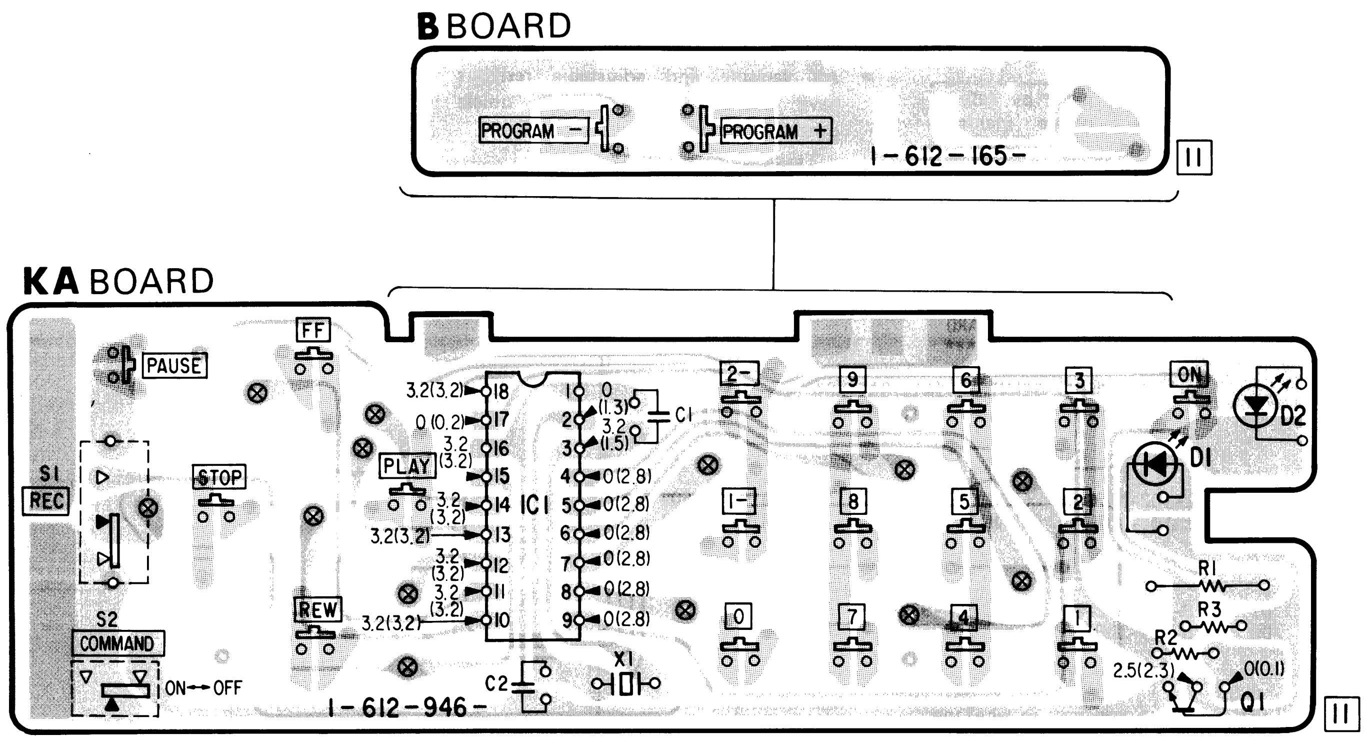
Stop button

● (record) button
To start recording, slide to the right.

How to press the programme select buttons
For programmes 1 through 9, press the corresponding single-digit button.
For 10 through 19, press "1-" for the tens-digit and then the corresponding single-digit button.
For 20 through 29, press "2-" and then the corresponding single-digit button.
For 30, press "0".
- If you do not press a single-digit button within several seconds after pressing "1-" or "2-", the previous programme position will be recalled.

2. PRINTED WIRING BOARDS

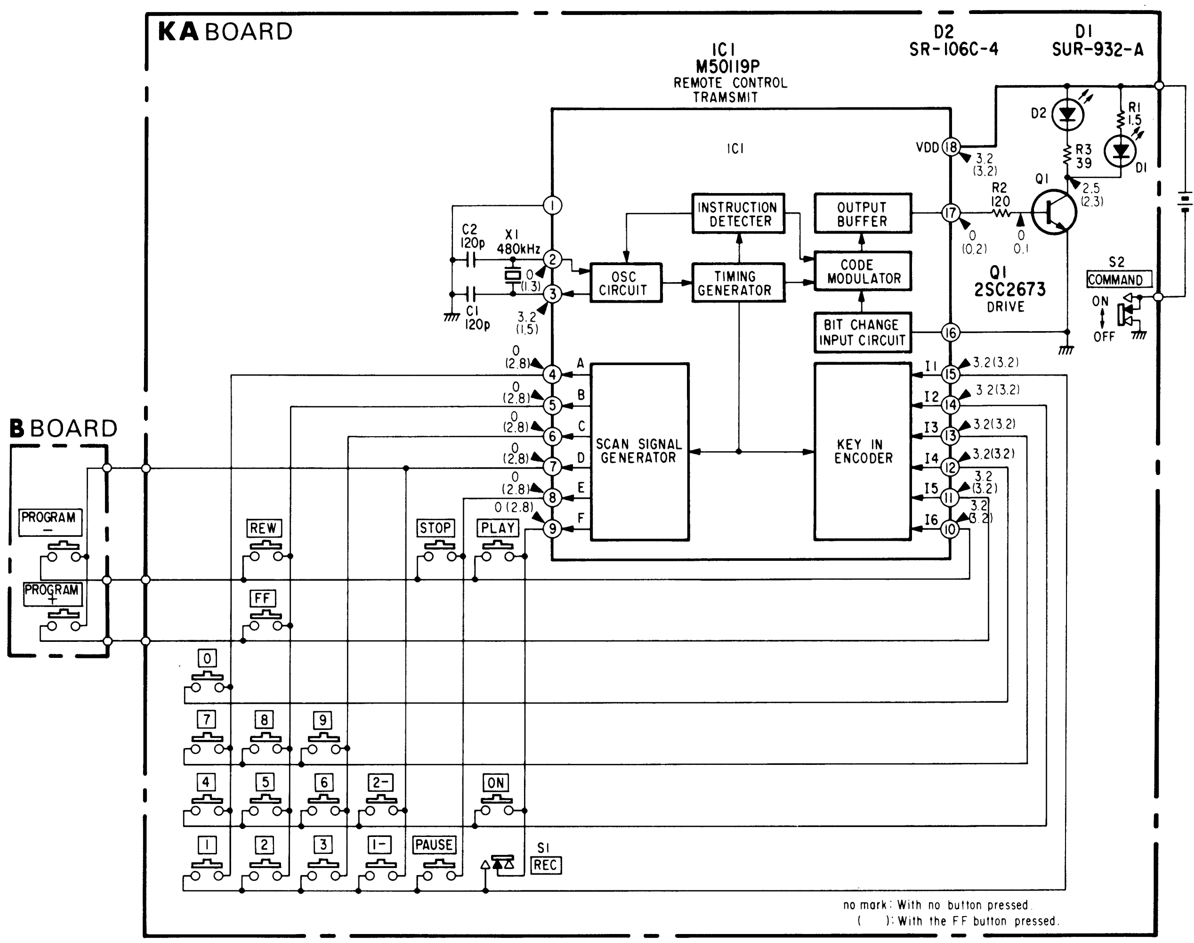
– Conductor Side –


B BOARD
PROGRAM –
PROGRAM +
1-612-165-
11
KA BOARD
PAUSE
FF
S1
REC
STOP
PLAY
REW
S2
COMMAND
ON→OFF
IC1
C1
C2
X1
D1
D2
R1
R2
R3
Q1
1-612-946-
11

no mark : With no button pressed.
( ) : With the FF button pressed.

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▨ : soldering side
- ▨ : B+ pattern
- : component side
- ▨ : Carbon pattern.


KA BOARD
IC1
M50119P
REMOTE CONTROL
TRAMSMIT
D2
SR-106C-4
D1
SUR-932-A
INSTRUCTION DETECTER
OUTPUT BUFFER
OSC CIRCUIT
TIMING GENERATOR
CODE MODULATOR
BIT CHANGE INPUT CIRCUIT
SCAN SIGNAL GENERATOR
KEY IN ENCODER
C2 120p
X1 480kHz
C1 120p
VDD
R1 1.5
R3 39
R2 120
Q1
2SC2673
DRIVE
BATTERY
SIZE "AA"
(IEC DESIGNATION R6)
2PCS 3V
S2
COMMAND
ON
OFF
B BOARD
PROGRAM –
PROGRAM +
REW
FF
STOP
PLAY
ON
PAUSE
S1
REC
no mark: With no button pressed.
( ): With the FF button pressed.

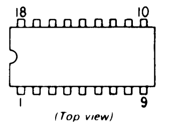
Note:

- All resistors are in ohms, 1/6W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- ——— : B+ bus.
- The voltage value is measured using a digital tester (10MΩ).

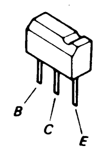
When indicating parts by reference number, please include the board name.

SEMICONDUCTORS

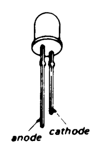
M50119P


18
10
1
9
(Top view)

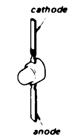
2SC2673



SLR932A


anode
cathode

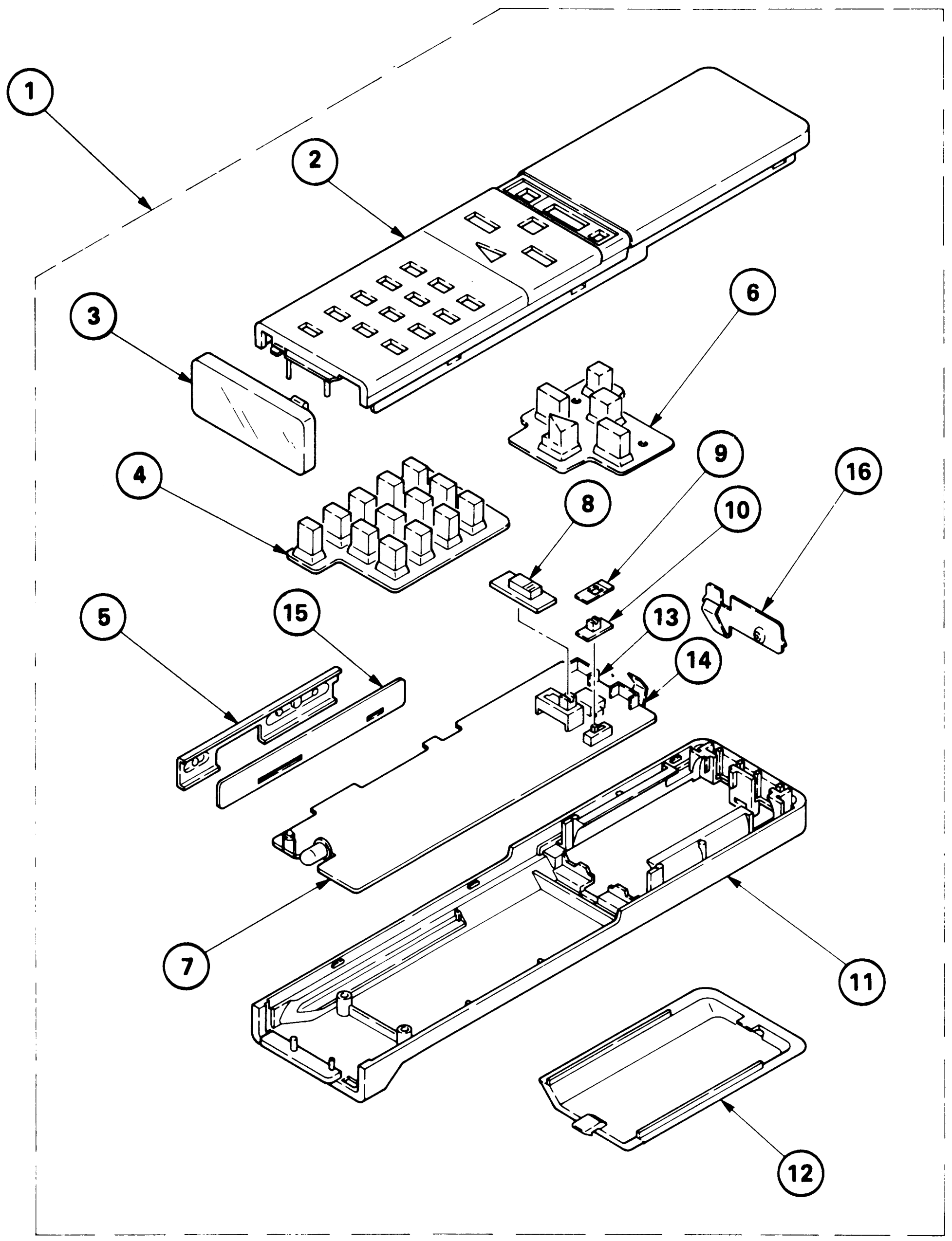
SR106C


cathode
anode

4. EXPLODED VIEW

NOTE:

- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.



No.	ParT No.	Description	Remark
1	A-6765-713-A	COMMANDER ASSY RMT-231	2-16
2	2-383-130-71	CASE (UPPER), COMMANDER RMT-231	
3	2-387-107-01	PANEL, COMMANDER (FRONT)	
4	2-383-128-01	RUBBER (A), CONTACT	
5	2-389-303-01	RUBBER (B), CONTACT	
6	2-383-129-01	RUBBER (C), CONTACT	
7	*1-612-946-11	KA BOARD	
8	2-387-101-01	BUTTON, RECORDING	
9	2-387-113-11	PLATE, COLOR	
10	2-383-127-01	BUTTON, SLIDE	
11	2-387-123-11	CASE (LOWER), COMMANDER	
12	2-387-105-01	COVER, BATTERY	
13	2-387-104-01	TERMINAL (B), BATTERY	
14	2-387-103-01	TERMINAL (A), BATTERY	
15	*1-612-165-11	B BOARD	
16	4-350-925-00	TERMINAL (C), BATTERY	

KA **B**

5. ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- MF : μF, PF : μμF

COILS

- MMH : mH, UH : μH

Ref.No	Part No.	Description	Remark
	*1-612-946-11	KA BOARD *********	
	2-387-103-01	TERMINAL (A), BATTERY	
	2-387-104-01	TERMINAL (B), BATTERY	
		CAPACITOR	
C1	1-102-107-00	CERAMIC 120PF 10% 50V	
C2	1-102-107-00	CERAMIC 120PF 10% 50V	
		DIODE	
D1	8-719-912-39	DIODE SLR-932A	
D2	8-719-100-06	DIODE SR106C	
		IC	
IC1	8-759-600-07	IC M50119P	
		TRANSISTOR	
Q1	8-729-967-32	TRANSISTOR 2SC2673	
		RESISTOR	
R1	1-246-405-25	CARBON 1.5 5% 1/4W	
R2	1-246-772-00	CARBON 120 5% 1/8W	
R3	1-246-766-00	CARBON 39 5% 1/8W	
		SWITCH	
S1	1-554-364-00	SWITCH, SLIDE	
S2	1-553-977-00	SWITCH, SLIDE	
		CRYSTAL	
X1	1-527-476-00	OSCILLATOR, CERAMIC	
**			
	*1-612-165-11	B BOARD ********	
**			